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PHYCOLOGIA AUSTRALICA;

OR,

A History of Australian Seaweeds;

COMPRISING

COLOURED FIGURES AND DESCRIPTIONS

OF THE MORE CHARACTERISTIC

MARINE ALGÆ OF NEW SOUTH WALES, VICTORIA, TASMANIA, SOUTH AUSTRALIA, AND WESTERN AUSTRALIA,

AND

A SYNOPSIS OF ALL KNOWN AUSTRALIAN ALGÆ.

VOL. IV.,

CONTAINING PLATES CLXXXI.-CCXL.

BY

WILLIAM HENRY HARVEY, M.D., F.R.S.,

MEMBER OF THE ROYAL IRISH ACADEMY, FELLOW OF THE LINNÆAN SOCIETY, COR. MEM. OF THE ROYAL ACADEMIES OF UPSAL AND MUNICH; OF THE IMP. ACAD. LEOP. CÆSAR. NAT. CURIOSORUM HON. MEM. OF THE LYCEUM OF NAT. HIST., NEW YORK, ETC. ETC. ETC.,

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TO

THE REV. JOHN FEREDAY, A.M.,

OF GEORGETOWN, TASMANIA,

WHO HAS CULTIVATED SEVERAL BRANCHES OF NATURAL HISTORY,

AND TO

MRS. FEREDAY,

AN ACCOMPLISHED AND SUCCESSFUL COLLECTOR OF ALGÆ,

The Fourth Volume of the 'Phycologia Australica'

IS INSCRIBED,

IN GRATEFUL MEMORY OF MANY KINDNESSES CONFERRED ON

THE AUTHOR,

DURING HIS STAY AT GEORGETOWN.

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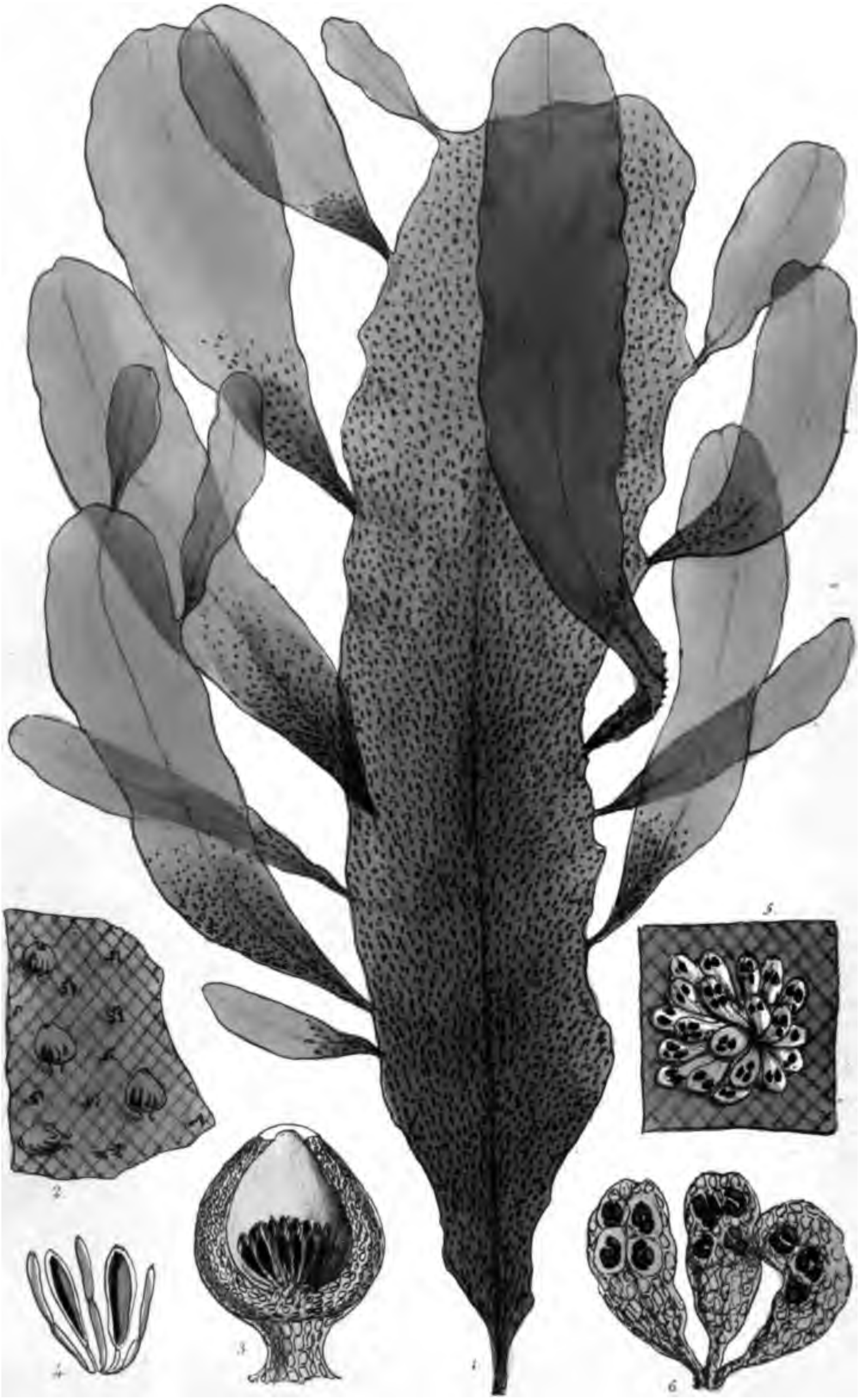

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Plate CLXXXI.

LENORMANDIA SPECTABILIS, *Sond.*

Gen. Char. *Frond* leaf-like, proliferous. *Phyllodia* flat, membranaceous, undivided, midribbed, obliquely cross-striate, internally honeycombed with rhomboidal cavities; the surface-cells minute. *Fructification* of both kinds scattered over the surface: the 1st, ovate, pedicellate *ceramidia,* containing pear-shaped spores; the 2nd, lanceolate *stichidia,* containing tripartite tetraspores.—Lenormandia (*Sond.*), in honour of M. René Lenormand, of Vire, Calvados, a distinguished French algologist.

Frons foliacea, prolifera. Phyllodia plana, membranacea, indivisa, costata, decussatim striata; cellulis intimis magnis lacunosis oblique ordinatis, extimis minutis inordinatis. Fruct. utriusque generis sparsus: 1, ceramidia pedicellata, sporas pyriformes foventia; 2, stichidia propria, lanceolata, tetrasporas triangule divisas continentia.

Lenormandia *spectabilis;* shortly stipitate or subsessile; phyllodia linear-oblong or linear, faintly costate or nearly nerveless, acute or attenuate at base, obtuse or retuse at the apex, very entire, echinulate; ceramidia ovate, scattered over the disc; stichidia obovate-oblong, tufted.

L. spectabilis; *brevissime stipitata v. subsessilis; phyllodiis lineari-oblongis linearibusve tenuissime costatis v. fere enerviis basi acutis v. attenuatis apice obtusis retusisve integerrimis echinulatis; ceramidiis ovatis sparsis; stichidiis obovato-oblongis fasciculatis.*

Lenormandia spectabilis, *Sond. in Pl. Preiss. v.* 2. *p.* 183. *Harv. Ner. Austr. p.* 18. *Kütz. Sp. Alg. p.* 849. *Harv. Alg. Austr. Exsic. n.* 127. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 537.

Lenormandia latifolia, *Harv. Ner. Austr. p.* 19.

Hab. Western Australia, *Preiss, Mylne.* Common at Garden Island, among rejectamenta, *W. H. H., G. Clifton.*

Geogr. Distr. West coast of Australia.

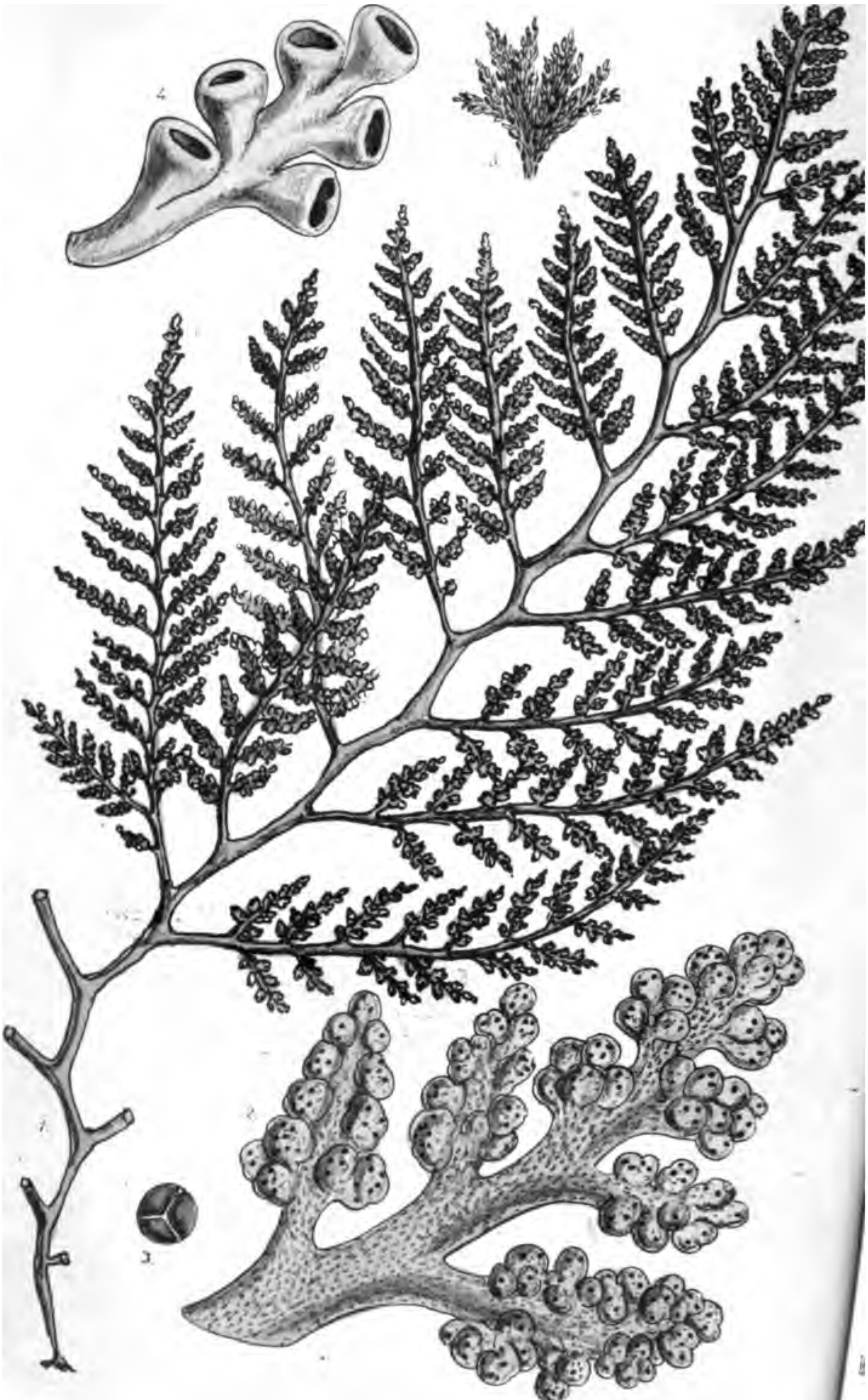
Descr. *Root* a small disc. *Frond* originating in, or wholly consisting of, an oblong lamina, traversed by a very slender midrib, which becomes fainter upwards, very variable in breadth, being from half an inch wide in the narrowest, to 4–5 inches wide in the broadest specimens. From the primary leaf there issue proliferously, either from its disc or margin, numerous similar fronds, and these bear others with similar irregularity, and thus a very compound and often densely imbricated general frond is produced. All the older leaves and leaflets are more or less thickly muricated with minute ciliary processes, giving a rough feel to the surface. In the broadest varieties the nerve is very faint, and sometimes disappears altogether; in the narrow and more compound it can usually be traced quite to the apex. *Fructification* of both kinds is scattered over the surface; the conceptacles (*ceramidia*) being solitary, and the *stichidia* collected in little tufts. The conceptacles are ovate, shortly stipitate, with thick, cellular walls, and they contain a tuft of pear-shaped spores. The *stichidia* are narrow-obovate or spathulate, and contain a few tetraspores, in double or single row. The *colour* is a deep purplish-red, turning brown in drying. The *substance* is rather rigidly membranous. The young frond scarcely adheres to paper in drying, and the old one does not adhere.

* * *

This is the original species upon which the genus *Lenormandia* was founded, and by comparing our figure with *L. Muelleri* (Plate XLV.), it will be seen how nearly that plant is related to this. Except in the more or less valid nerving, a character of but slight importance, the two scarcely differ. Mere ramification, in an irregularly *proliferous* frond, cannot be depended on; and in breadth and outline of the phyllodia, individuals growing side by side vary extremely. Our figure represents an average or *typical* specimen, but it would have been easy to have selected one with much narrower, even linear fronds, or with greatly broader. Some of the broader specimens, indeed, are almost completely destitute of midrib altogether, appearing (at least when dry) deserving of the name *enervis*. Others again are nearly smooth, others very rough; some of delicate membranous substance, and some coarse and thick. On the whole, therefore, seeing the variability of *L. spectabilis* in its one locality, I am disposed to regard *L. Muelleri* as merely one of its extremely divaricated forms, and perhaps *L. Chauvinii* (of New Zealand) as another. The Tasmanian *L. marginata*, on the contrary, seems to be a well marked species.

Fig. 1. LENORMANDIA SPECTABILIS,—*the natural size*. 2. Small fragment of the lamina, bearing conceptacles. 3. Longitudinal section of a conceptacle. 4. Spores. 5. Fragment of lamina, bearing a tuft of stichidia; stichidia containing tetraspores:—*magnified*.

Plate



Vincent Brooks Imp.

PLATE CLXXXII.

LAURENCIA BOTRYOIDES, *Gaill.*

GEN. CHAR. *Frond* cylindrical or plano-compressed, linear, pinnately branched, cartilaginous, the apices obtuse, composed of two strata of cells; the *inner* of oblong, angular cells, shorter toward the circumference; the *outer* of small, roundish-angular cellules. *Fruit:* 1, ovate, sessile *ceramidia,* containing a tuft of pear-shaped spores; 2, tripartite *tetraspores,* imbedded, without order, beneath the tips of the ramuli.—LAURENCIA (*Lamour.*), in honour of M. de La Laurencie, a French naturalist.

Frons teretiuscula v. plano-compressa, linearis, pinnato-ramosa, cartilaginea, apicibus obtusis, ex stratis duobus contexta; strato medullari ex cellulis oblongis extus sensim brevioribus, corticali ex cellulis minoribus rotundo-angulatis coloratis. Fruct.: 1, *ceramidia ovata, sessilia, intra pericarpium crassiusculum fasciculum sporarum pyriformium foventia;* 2, *tetrasporæ triangule divisæ, infra apicem ramulorum sine ordine immersæ.*

LAURENCIA *botryoides:* dull-purple; frond subcompressed, distichously decompound-pinnate, with a flexuous excurrent rachis; pinnæ alternate, patent, once or twice compound; pinnules conical, obtuse, densely tuberculated (like grape-clusters), the warts globose; sporiferous ramuli similar, bearing tetraspores in the warts; conceptacles . . . . ?; male receptacles saucer-shaped, terminal, full of flocci, bearing antheridia.

L. botryoides; *purpurascens; fronde compressiuscula disticke decomposito-pinnata, rachide flexuosa excurrente; pinnis alternis patentibus plus minus decompositis; pinnulis conoideis obtusis dense botryoideo-tuberculatis, tuberculis globosis; sporiferis conformibus tetrasporas in tuberculis circumcirca nidulantes gerentibus; ceramidiis . . . . ?; receptaculis masculis terminalibus discoideis apertis fila antheridiifera gerentibus.*

LAURENCIA botryoides, *Gaill. Res. p.* 15. *Sond. in Pl. Preiss. v.* 2. *p.* 179. *Harv. Alg. Tasm. n.* 31; *Ner. Austr. p.* 82; *Fl. Tasm. v.* 2. *p.* 307. *J. Ag. Sp. Alg. v.* 2. *p.* 759. *Harv. Alg. Austr. Exsic. n.* 239.

CHONDRIA botryoides, *Alg. Sp. p.* 346; *Syst. p.* 204.

FUCUS botryoides, *Turn. Hist. t.* 178.

HAB. Shores of Kent Islands, *R. Brown.* Tasmania, *Gunn.* Port Fairy, Victoria, abundantly, *W. H. H.* Western Australia ?, *Preiss.*

GEOGR. DISTR. Southern (and western ?) shores of Australia. Tasmania.

DESCR. *Root* discoid, or slightly branched. *Frond* 8-12 inches high or more, 1-1½ line in diameter, the older parts terete, the younger more or less compressed, distichously much branched in a pinnate order. The ***main rachis*** and those of the larger branches more or less flexuous or zigzag, and prolonged (excurrent) into a tapering point beyond the uppermost pinnæ. ***Pinnæ*** alternate, ½–1 inch apart, patent, the lowest longest, the rest gradually shorter upwards, simply or doubly pinnate. ***Pinnules*** resembling small clusters of grapes, densely warted on all sides; the warts globose or hemispherical. ***Ramuli*** that bear tetraspores are precisely like the others. ***Male receptacles*** saucer-shaped; their cavity filled with very fragile, densely packed filaments, bearing abundant yellow antheridia. ***Colour*** a dull purple, or greenish, or very pale, according to exposure; darkening in drying. ***Substance*** firmly cartilaginous and elastic. The frond shrinks considerably in drying, and adheres to paper.

~~~

One of the larger and handsomer species of *Laurencia,* appropriately named *botryoides,* from the resemblance of its ultimate pinnules to bunches of grapes; a resemblance which is very striking on specimens where the pinnules retain a deep purple colour, while the larger branches are bleached or greenish-white. This is the case in sun-exposed specimens, and these, from the plant commonly growing between tide-marks, are the most abundant. Fronds grown on the very edge of low-water, or below it, are uniformly lurid-purple.

Originally figured by Turner, from specimens collected by Brown, it has been in more recent times confounded with other forms, now held for distinct species; and as I have myself contributed to this confusion, I more willingly now figure what I suppose to be a fairly typical specimen of what is assuredly a variable plant.

Fig. 1. LAURENCIA BOTRYOIDES,—*the natural size.* 2. Part of a pinnule, with *grape-clusters.* 3. A tetraspore. 4. A ramulus, bearing male saucers. 5. Flocci from the same:—variously *magnified.*
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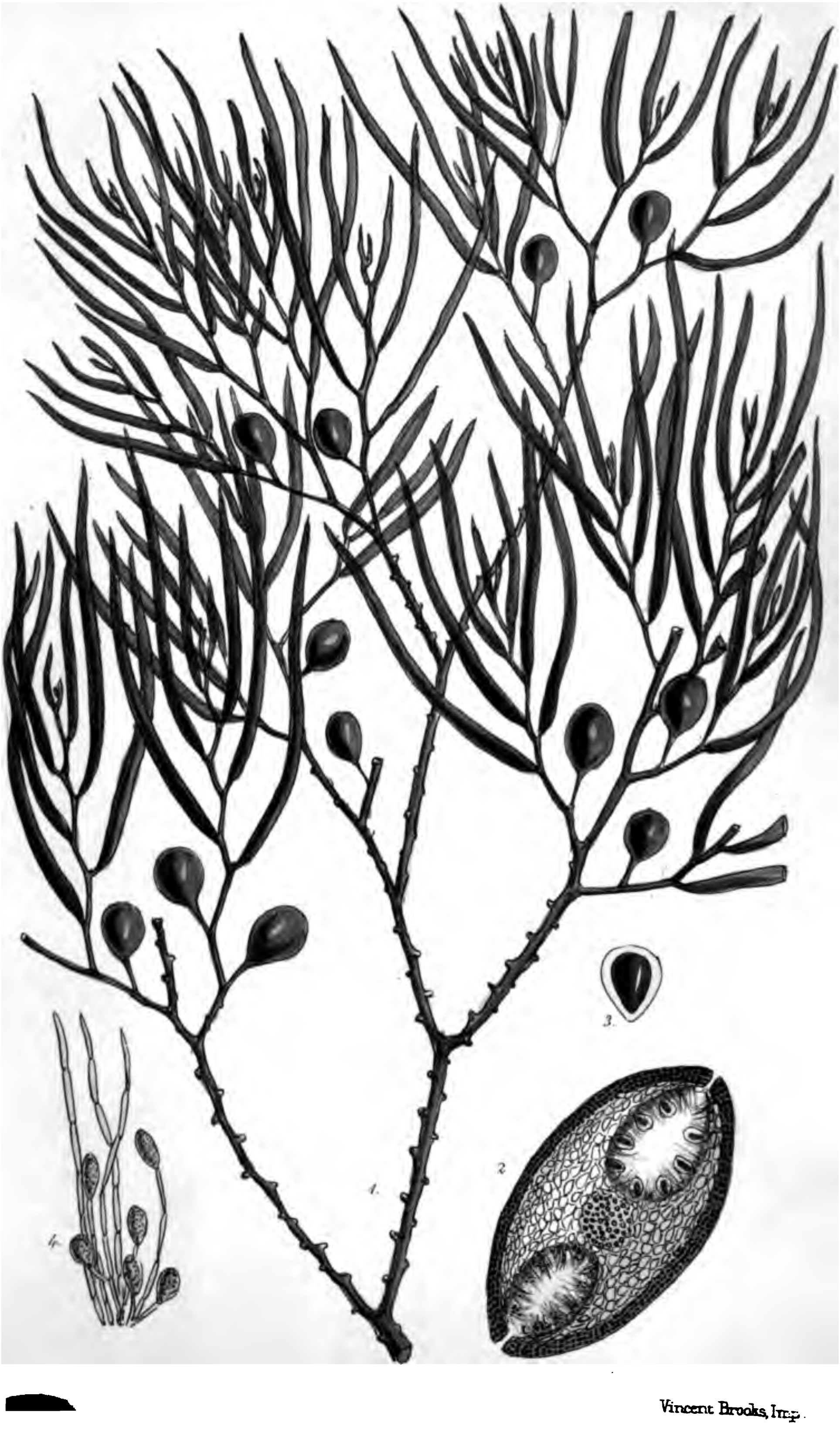
Plate CLXXVIII.



Vincent Brooks, Imp.

PLATE CLXXXIII.

CYSTOPHORA GREVILLEI, *J. Ag.*

Gen. Char. *Root* scutate. *Frond* pinnately decompound, dendroid, with a distinct stem, branches, and ramuliform leaves. *Vesicles* stipitate, simple, rarely absent. *Receptacles* pod-like, torulose or moniliform, developed in the ramuli. *Scaphidia* hermaphrodite. *Spores* obovoid, —Cystophora (*J. Ag.*), from *κυστις, a bladder*, and *φορεω, to bear.*

Radix scutata. Frons pinnatim decomposita, dendroidea, caule proprio, ramis foliisque ramuliformibus donata. Vesiculæ stipitatæ, simplices, raro nullæ. Receptacula siliquæformia, torulosa v. nodulosa, apice ramulorum evoluta. Scaphidia hermaphrodita.

Cystophora *Grevillei;* stem terete, decompound-pinnate; pinnæ distichous, furnished at base with alternate, obtuse tubercles (the stumps of fallen pinnules); pinnules pinnate, the terminal ones changed into long, ensiform, compressed receptacles; vesicles spheroidal, about one to each pinna.

C. Grevillei; *caule tereti decomposito-pinnato; pinnis distichis basi tuberculis obtusis alternis minutis; pinnulis pinnatis, ultimis in receptacula elongata compressa ensiformia abeuntibus; vesiculis sphæricis in pinna subsingulis.*

Cystophora Grevillei, *J. Ag. Sp. Alg. v.* 1. *p.* 245. *Harv. Alg. Exsic. Austr. n.* 11.

Cystoseira Grevillei, *Ag. in Grev. Syn. p.* 33. *Sond. in Lehm. Pl. Preiss. v.* 2. *p.* 160.

Blossevillea Grevillei, *Kütz. Sp. Alg. p.* 629.

Hab. Western Australia, *Frazer, Preiss, W. H. H., etc.*

Geogr. Distr. West coast of Australia.

Descr. *Stem* several feet long, 1½ line in diameter, terete, distichously much branched in alternately pinnate order; the *branches* 1–3 feet long, more or less patent or reflexed at their insertion. *Pinnæ*, or secondary branches, a foot or more long, either very patent or erecto-patent at their insertion, once or twice pinnately compound, denuded of ramuli in their lower half, but alternately tuberculated with the stumps of the fallen ramuli; these tubercles are 1–3 lines apart on the younger, 6–8 lines apart on the older branches. *Pinnules* quite simple, subulate, 1–1½ inch long; the terminal ones transformed into receptacles. *Vesicles* few, one near the base of each subdivision of the frond, 2–3 lines in diameter, either globose or oval. *Receptacles* lanceolate, 1½–2 inches long, compressed, not torulose, with distichous *scaphidia*, which either bear spores or antheridia. *Colour* a dark brown-olive, becoming black when dry. *Substance* coriaceous.

* * *

One of the larger, but not one of the handsomer, of the western species of *Cystophora,* distinguished from other distichous species by its slender, terete or nearly terete stems and branches, and by its very loose ramification, and long, but not torulose receptacles. In general aspect it may be compared to the *Cystoseira fibrosa* of the northern hemisphere.

Fig. 1. CYSTOPHORA GREVILLEI, part of a frond,—*the natural size*. 2. Section of a receptacle. 3. A spore, antheridia, and paranemata:—variously *magnified*.

Plate CL

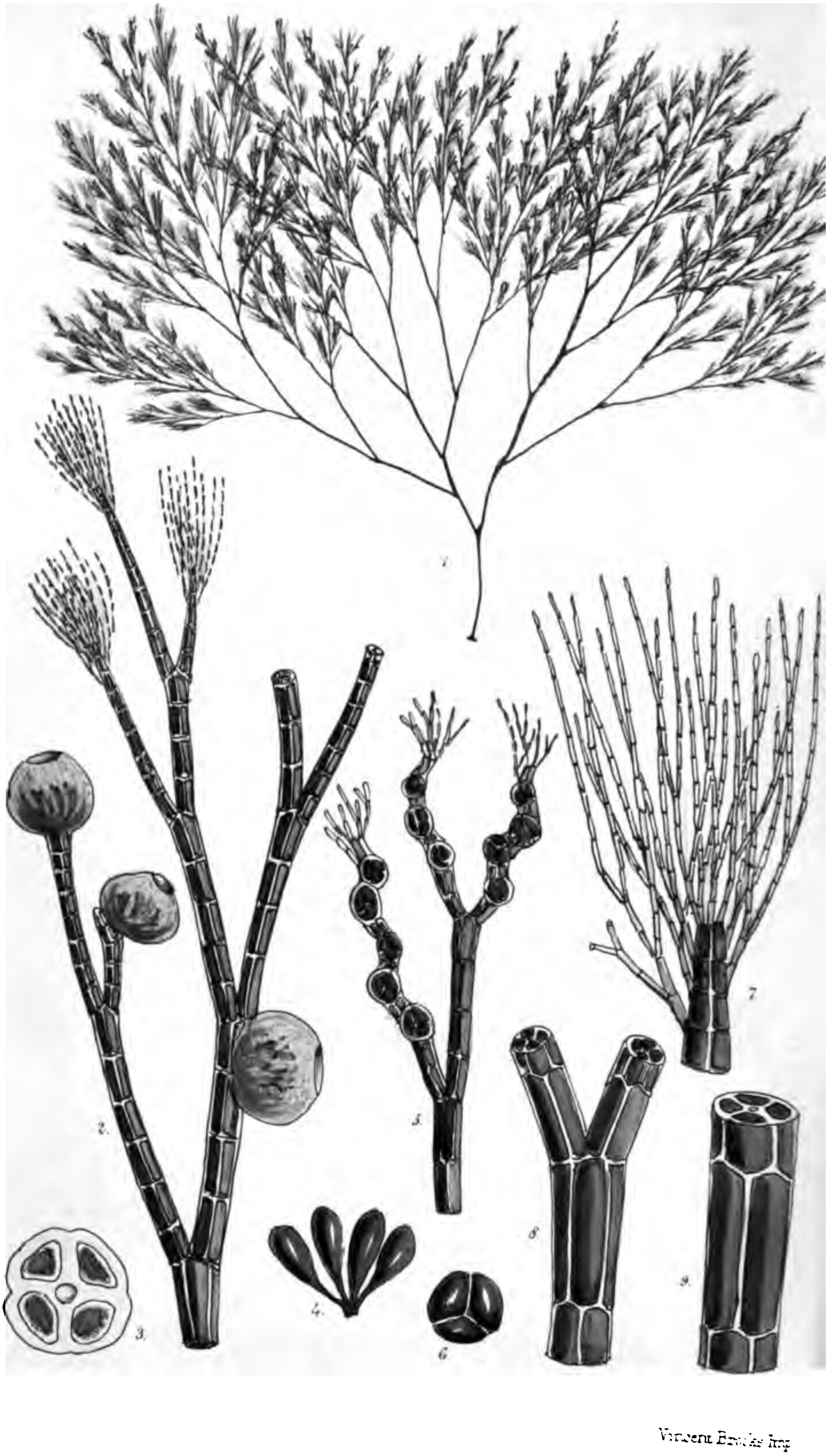


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PLATE CLXXXIV.

POLYSIPHONIA BLANDI, *Harv.*

GEN. CHAR. *Frond* filiform, partially or generally articulate; the joints longitudinally striate, composed of numerous cylindrical cells surrounding a central cell (sometimes coated with one or several rows of smaller cells). *Fructification:* 1, ovate or urceolate *ceramidia,* containing a tuft of pear-shaped spores; 2, *tetraspores,* immersed in swollen branches.—POLYSIPHONIA (*Grev.*), from *πολυς, many,* and *σιφων, a tube.*

Frons filiformis, plus minus articulata; articulis longitudinaliter pluristriatis, ex cellulis 4–20 *cylindraceis cellulam centralem cingentibus formatis (nunc cellulis minoribus pluriseriatis corticatis). Fruct.:* 1, *ceramidia;* 2, *tetrasporæ in ramulis ultimis uniseriatæ.*

POLYSIPHONIA *Blandi;* dark red-brown; fronds subsolitary, capillary, pellucidly articulate, dichotomously or alternately decompound; the lower branches bare, all the upper (younger) ones closely set with short, corymbose, multifid, alternate ramuli; apices of the ramuli densely fibrilliferous; articulations 4-tubed, the lower 2–3 times, the upper once and half as long as broad; ceramidia globose, sessile or terminal, with wide apertures.

P. Blandi; *badia; frondibus subsolitariis paucisve capillaribus pellucide articulatis dichotomis v. alterne decompositis; divisuris inferioribus nudis, superioribus (junioribus) ramuliferis; ramulis alternis corymbosis brevibus multifidis apice densissime fibrilliferis; articulis inferioribus diametro 2–3-plo, superioribus sesquilongioribus; ceramidiis globosis sessilibus terminalibusque.*

POLYSIPHONIA Blandi, *Harv. Alg. Austr. Exsic. n.* 170.

HAB. New Brighton, Port Phillip, *W. H. H.*

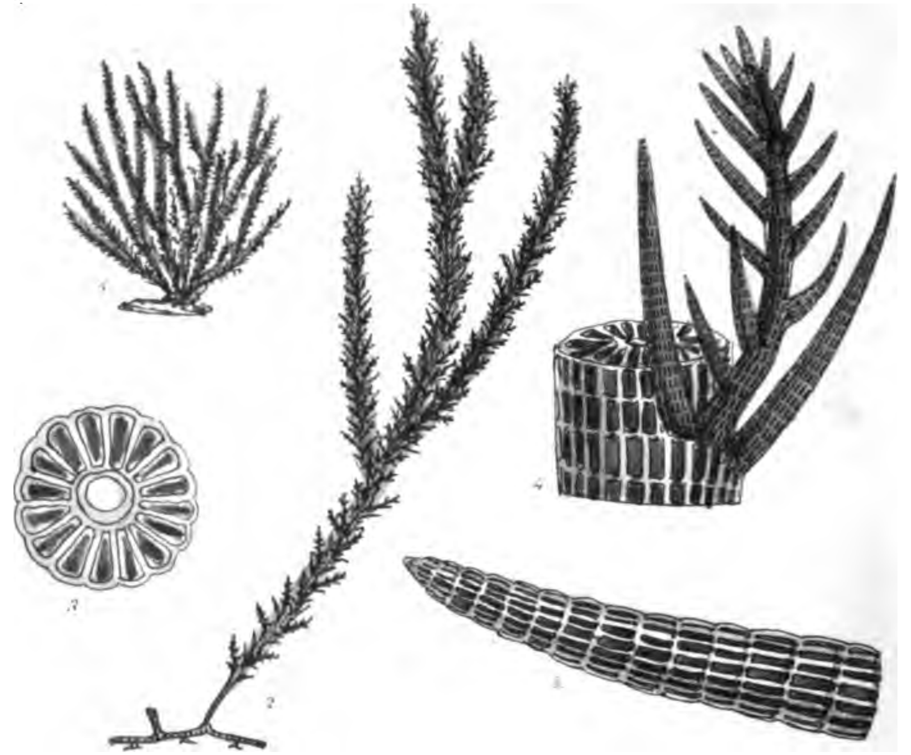
GEOGR. DISTR. Port Phillip.

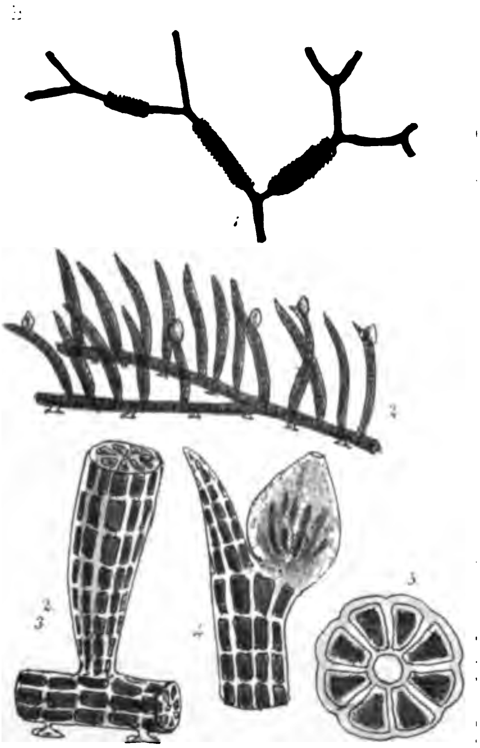
DESCR. *Root* discoid. *Fronds* either solitary or few together, not entangled, three or four inches high, rather thicker than human hair, but not as thick as bristle, repeatedly but irregularly forked; the lowest division mostly dichotomous, the upper more alternate; all the lower naked, with distant forks and acute axils; the upper somewhat virgate, closely set throughout with short multifid ramuli. *Ramuli* 2–3 lines long, corymbose, alternately multifid; all their divisions densely fibrilliferous, with dark-coloured, dichotomous fibres. *Articulations* short throughout the frond; the lower not much longer than the upper, none more than thrice as long as broad, 4-tubed, with thick walls. *Ceramidia* quite sessile, very wide in proportion to the length, with large apertures; sometimes they are lateral, and sometimes they terminate the branchlets. *Tetraspores* in distorted ultimate ramuli.

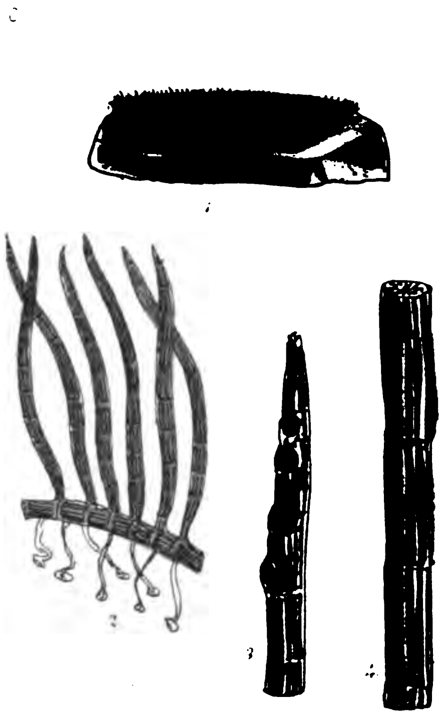
The *colour* is a very dark, rich red-brown, becoming darker and browner in drying. The *substance* is soft and rather flaccid, and the frond adheres closely to paper in drying.

Of this pretty little species, named in compliment to my friend Mr. Bland, of Melbourne (if for no better reason, perhaps because itself deserving of the name of "*blanda*"), I collected many specimens at Brighton Beach, Port Phillip, but have not noticed it elsewhere, nor received it from any of my correspondents. As a species it is perhaps as nearly, if not more nearly, allied to the European *P. fibrata* than to any of the Australian forms; among which it most approaches *P. mollis*, but differs in colour, substance, and various characters. From *P. fibrata* it is chiefly to be known by the length of its articulations and the somewhat different form of the ceramidia.

Fig. 1. POLYSIPHONIA BLANDI,—*the natural size.* 2. Part of a branch, bearing *ceramidia.* 3. Cross section of branch. 4. Spores. 5. Apex of a branch, bearing *tetraspores.* 6. A tetraspore. 7. Fibrilliferous apex. 8, 9. Portion of frond, showing articulations of various lengths:—all more or less *magnified.*







Vincent Brooks Imp.

PLATE CLXXXV. (A).

POLYSIPHONIA ERICOIDES, *Harv.*

GEN. CHAR. Same as in Plate CLXXXIV.

POLYSIPHONIA *ericoides;* small, blackish, rigid, rising from creeping filaments; fronds erect, pellucidly articulate, sparingly branched; the branches virgate; both stem and branches densely clothed with short, spine-like ramuli, often having a spiniferous ramulus in the axil; articulations thrice shorter than their diameter, with about 16 tubes.

P. ericoides; *pusilla, nigrescens, rigidiuscula, e filis repentibus orta; frondibus erectis pellucide articulatis parum ramosis; ramis virgatis cum fronde primaria ramulis minutis spinæformibus quaquaversum egredientibus dense vestitis, sæpius ramulis axillaribus spiniferis alternantibus; articulis diametro triplo brevioribus, siphonibus* 16.

POLYSIPHONIA ericoides, *Harv. in Lond. Journ. v.* 6. *p.* 400; *Ner. Austr. p.* 50; *Fl. Tasm. v.* 2. *p.* 301.

HAB. Tasmania, *Rev. Mr. Ewing.* Port Arthur, on tidal stones, *W. H. H.*

GEOGR. DISTR. Tasmania.

DESCR. *Fronds* rising from a mat of creeping fibres, 1–2 inches high, ultra-setaceous, rigid, not much branched; branches alternate, simple, erect. All parts of the frond are closely beset, on all sides, with minute ramuli, of two kinds, one simple and spine-like, the other (usually supra-axillary, set with subquadrifarious spines. *Articulations* very short, multistriate, showing about 16 tubes on a cross section. *Fruit* not observed. *Colour* very dark.

(A.) Fig. 1. POLYSIPHONIA ERICOIDES,—*the natural size.* 2. A frond. 3. Cross section of the stem. 4. Fragment of branch, with simple and spiniferous ramuli. 5. Apex of a ramulus:—variously *magnified.*

PLATE CLXXXV. (B.)

POLYSIPHONIA PROREPENS, *Harv.*

POLYSIPHONIA *prorepens;* minute, parasitical, frond prostrate, creeping, vaguely divided; branches emitting from every articulation, erect, secund, compressed, thick, simple, falcate, acute ramuli, tapering at base; tubes 8 to 12; articulations shorter than their diameter, those of the ramuli very short; ceramidia solitary, nearly apical, sessile, ovate; tetraspores seriated in the ramuli.

P. prorepens; *minuta; fronde prona prorepente vage divisa; ramis e geniculo fere quoque ramulos erectos secundos compressos simplices falcatos acutos basi attenuatos emittentibus; siphonibus* 8–12; *articulis diametro brevioribus, ramulorum brevissimis; ceramidiis solitariis fere apicalibus; tetrasporis in ramulis seriatis.*

POLYSIPHONIA prorepens, *Harv. Ner. Austr. p.* 50; *Alg. Austr. Exsic. n.* 181.

HAB. Parasitical on *Dicranema Grevillei,* at King George's Sound, *W. H. H.*

Geogr. Distr. South-western Australia. Cape of Good Hope.

Descr. Thickly coating the surface of what it grows on with a velvet-like pile of minute, erect ramuli, not ½ a line long, rising from prostrate, creeping, vaguely branched filaments, which are 1–2 inches long, and completely hidden. The *frond* is pellucidly articulate throughout. The *colour* is a very dark red, becoming brown or black in drying. The *tubes* vary from 8 to 12. *Ceramidia* ovate, subterminal. *Substance* rigid.

* * *

First described from specimens from Algoa Bay, C. B. S., where it occurs on corallines. The Australian plant is more slender, with fewer tubes, but otherwise the same.

(B.) Fig. 1. Part of a frond of *Dicranema Grevillei*, with *Polysiphonia prorepens* growing on it,—*the natural size*. 2. Creeping branch and ramuli of *P. prorepens*. 3. Base of ramulus and part of creeping stem. 4. Apex of ramulus, with a *ceramidium*. 5. Cross section :—*magnified.*

Plate CLXXXV. (C.)

POLYSIPHONIA CALOTHRIX, *Harv.*

Polysiphonia *Calothrix;* minute, densely cæspitose, growing on rocks, dark brown; frond prostrate, creeping, with long radicular fibres, vaguely divided; branches emitting from nearly every articulation, erect, secund, simple, subulate, acute ramuli, tapering at base; tubes 10–12; articulations of the creeping frond half as long as broad, of the ramuli once and half, twice or thrice as long as broad; tetraspores few, seriated in the ramuli.

P. Calothrix; *minuta, dense cæspitosa, rupestris, badia; fronde prostrata repente filis radicantibus longis vage ramosa; ramis e geniculo fere quoque ramulos erectos secundos emittentibus; ramulis simplicibus subulatis acutis basi attenuatis; siphonibus* 10–12; *articulis surculorum diametro duplo brevioribus, ramulorum sesqui-duplo-triplove longioribus; tetrasporis paucis in ramulis seriatis.*

Polysiphonia Calothrix, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 541; *Alg. Austr. Exsic. n.* 178.

Hab. On rocks, at half-tide level. King George's Sound, *W. H. H.*

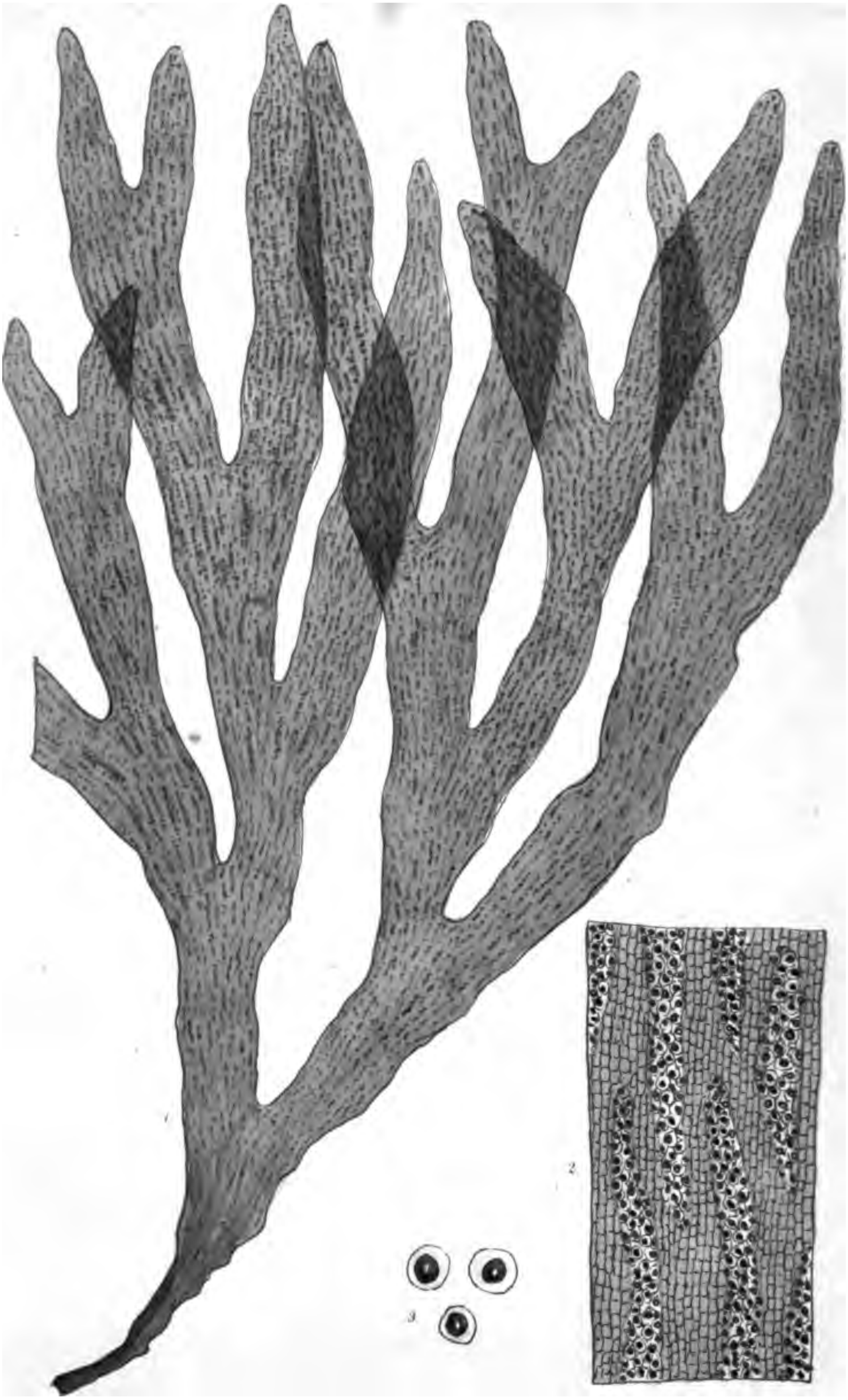
Descr. Forming wide, plush-like patches on the surface of rocks, to which the prostrate, vaguely-branched fronds are attached by long, lateral, hyaline, creeping fibres, each terminating in a flat peltate disc. *Ramuli* rising from every joint, 2–3 lines long, quite simple, subulate, but narrowed to the base, taper-pointed. *Colour* dark purplish-brown. *Substance* soft.

* * *

This agrees with *P. prorepens* in ramification, but differs in habit and habitat, in substance, in the length of the articulations of the ramuli, and in size.

(C.) Fig. 1. Patch of Polysiphonia Calothrix, on a piece of rock,—*the natural size.* 2. Part of the creeping frond, and erect ramuli. 3. Apex; and 4. Middle portion of a ramulus :—*magnified.*

Plate CLXXVI



Vincent Brooks Imp

PLATE CLXXXVI.

DICTYOTA NÆVOSA, *Suhr.*

GEN. CHAR. *Root* woolly. *Frond* flat, linear, membranous, ribless, areolate, dichotomous or irregularly cleft. *Fructification: spores* superficial, either collected in spot-like sori or scattered singly over both surfaces of the frond.—DICTYOTA (*Lamonr.*), from *δικτυον, a net;* because the surface, under a lens, has a netted, or, rather, a tessellated appearance.

Radix stuposa. Frons plana, linearis, membranacea, ecostata, areolata, dichotoma aut vage fissa. Fruct.: sporæ superficiales, in soros maculæformes aggregatæ v. singulatim per utramque paginam frondis dispersæ.

DICTYOTA *nævosa;* frond decompound-dichotomous, segments elongate, broadly-linear, quite entire, obtuse or subacute; areolæ square; spores in oval-oblong or linear spot-like sori, scattered over the whole surface of the frond.

D. nævosa; *fronde decomposito-dichotoma; segmentis elongatis lato-linearibus margine integerrimis obtusis v. acutiusculis; areolis subquadraticis; sporis in soros maculæformes ovali-oblongos lineares ve per totam superficiem sparsos collectis.*

DICTYOTA nævosa, *Suhr, in Flor.* 1834, *t.* 1. *f.* 4. *J. Ag. Sp. Alg. v.* 1. *p.* 95. *Harv. Alg. Austr. Exsic. n.* 74; *Fl. Tasm. v.* 2. *p.* 291.

DICTYOTA Pappeana, *Kütz. Sp. Alg. p.* 567.

HAB. Georgetown, Tasmania, *W. H. H.*

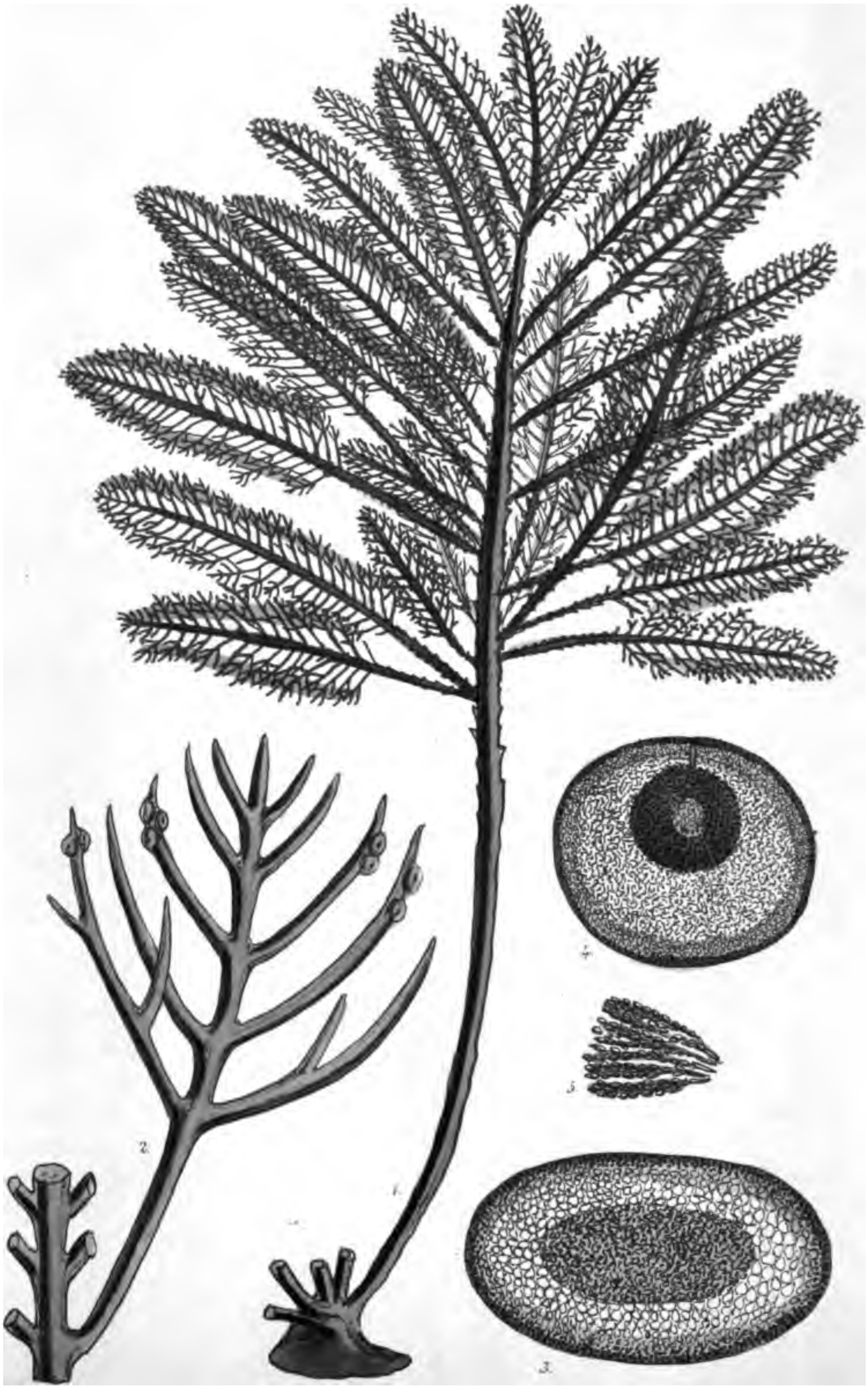
GEOGR. DISTR. Cape of Good Hope. Tasmania.

DESCR. *Root* (of the Tasmanian specimens) not seen. *Frond* 12–18 inches long, very much divided, nearly regularly dichotomous, the segments about half an inch broad, or rather broader, linear, flat or slightly undulating, quite entire at the margin, with narrow and subacute axils, very erect, sometimes tapering at the extremity to a bluntish point, sometimes rounded or emarginate at the apex. *Sori* very abundant, thickly scattered over the whole frond, oblong or linear, extending longitudinally. *Colour* a pale greenish-olive, or darker, varying with the age of the specimen. *Substance* when young membranous and thin, afterwards thicker. When young, the frond adheres to paper in drying.

I venture to refer the specimens, one of which is here figured, to the *D. nævosa* of Von Suhr, described originally from Cape of Good Hope individuals. In general aspect and size, and in the great abundance of sori, the two very nearly agree, but the Cape plant is of firmer substance and less translucent than the Tasmanian, and its sori are scarcely so much drawn out or lengthened. These differences however appear to me to be unimportant if we bear in mind that the Cape specimens were grown in the open sea, exposed to the rough billows of the "Cape of Storms," while the Tasmanian flourished in the deep and quiet estuary of the Tamar, a locality which is well known to favour great luxuriance and delicacy of frond, and an attenuation of parts, in all other Algæ: while it is also known that an exposed, stormy coast has a contrary influence.

Fig. 1. DICTYOTA NÆVOSA,—*the natural size.* 2. Small portion of the frond. 3. Spores:—*magnified.*

Plat. C[illegible]



Vincent Brooks Imp.

PLATE CLXXXVII.

THYSANOCLADIA OPPOSITIFOLIA, *J. Ag.*

GEN. CHAR. *Frond* flat or compressed, distichously decomposito-pinnate, formed of three strata of cells; the medullary of densely interwoven, slender, longitudinal filaments; the intermediate of roundish-oblong cells; the cortical of minute, vertically arranged cellules. *Fructification:* 1, half-immersed conceptacles, containing, within a thick pericarp, minute *spores* arranged in spore-threads radiating from a large placenta; 2, *tetraspores ?*—THYSANOCLADIA (*Endl.*), from θυσανος, *a fringe*, and κλαδος, *a branch.*

Frons plana v. compressa, disticha decomposito-pinnata, triplici strato contexta; medullari filis longitudinalibus tenuibus articulatis densissime intertextis, intermedio cellulis majusculis rotundato-oblongis, corticali cellulis minimis verticaliter seriatis coloratis composito. Fruct.: 1, *cystocarpia semi-immersa, intra pericarpium crassum sporas minutas in filis a placenta magna radiantibus ordinatas foventia; tetrasporæ ?*

THYSANOCLADIA *oppositifolia;* stem and virgate branches compressed, two-edged; the branches denuded at base, closely decompound-pinnate above; pinnæ distichous or fascicled, narrow-linear, once or twice pinnulated; pinnules opposite, subulate, simple or ramuliferous, acute.

T. oppositifolia; *caule ramisque virgatis compresso-ancipitibus; ramis basi sæpius denudatis supra creberrime decomposito-pinnatis; pinnis distichis v. fasciculatis anguste linearibus pinnatis v. bipinnatis; pinnulis oppositis subulatis simplicibus v. apice, ramuliferis.*

THYSANOCLADIA oppositifolia, *J. Ag. Sp. Alg. v.* 2. *p.* 617.

THYSANOCLADIA pectinata, *Grev. et Harv. Ner. Austr. p.* 91.

GELIDIUM oppositifolium, *Grev. Sond. in Lehm. Pl. Preiss. v.* 2. *p.* 174. *Kütz. Sp. Alg. p.* 766.

SPHÆROCOCCUS oppositifolius, *Ag. Sp. Alg. t.* 294; *Syst. p.* 230.

HAB. New Holland, *Agardh.* Swan River, *Mylne, Preiss.* Rottnest Island, *W. H. H.* Garden Island, *in fruit, G. Clifton.*

GEOGR. DISTR. West coast of Australia.

DESCR. *Root* a large disc, nearly an inch in diameter. *Stem* usually dividing near the base into several, long, simple, virgate, strongly compressed branches or secondary stems, each of which is 6–12 or 18 inches long. These branches, except the young ones, are denuded for half their length or more, and closely feathered with slender decompound pinnæ in their upper half; the older ones frequently however throw out a new crop of short ramuli, both along the denuded portion and along the rachis of the pinnated part, these ramuli being simple or pinnate, squarrose, and very irregular in ramification and insertion. *Pinnæ* 2–3 inches long, the lowest longest, ⅓ line in width, compressed, once, twice, or thrice pinnulated. Pinnules opposite, very close together, subulate, acute, some simple, some again pinnulated in their upper half. *Conceptacles* 2–3 together, near the tips of the ultimate pinnules, containing a very dense nucleus. The *colour* is a very dark brownish-red, becoming much darker and browner in drying. *Substance* coriaceous and very tough. In drying the frond does not adhere to paper.

In structure of frond and in general habit, the genus *Thysanocladia* (and especially the species here figured) agrees well with *Gelidium* and its allies; but in the structure of the cystocarp,—though this too seems in an intermediate condition,—the preponderance of character is in favour of *Sphærococcoideæ*, where it is placed by Agardh. I formerly erroneously referred it to *Laurenciaceæ*.

Founded on the *Rhodomela ? dorsifera* of Agardh, *Thysanocladia* now includes several species, all natives of Australia except one, which is found under the ledges of coral-reefs in the Pacific. All are deep-water plants and of a peculiarly rigid texture, brightly coloured when growing, but invariably darkening or even blackening in drying.

Fig. 1. THYSANOCLADIA OPPOSITIFOLIA,—*the natural size*. 2. A pinnated ramulus (*plumule*). 3. Cross section of the frond. 4. Cross section of fertile ramulus and *conceptacle*. 5. Spore-strings :—*magnified*.

Plate CLXXVIII.

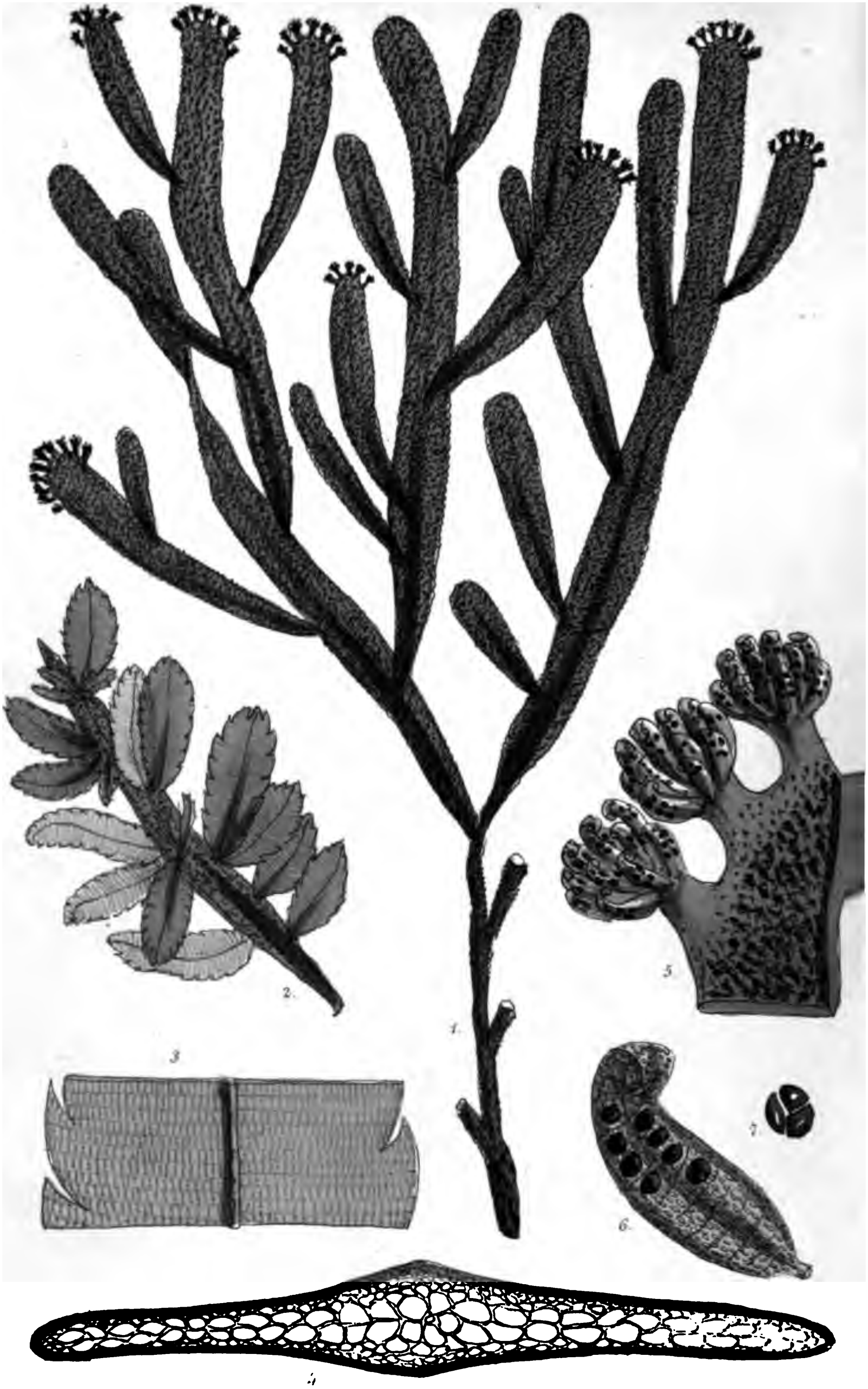


PLATE CLXXXVIII.

POLYPHACUM PROLIFERUM, *Ag.*

GEN. CHAR. *Frond* proliferous. *Phyllodia* flat, linear, midribbed; very rough on both sides with wart-like or spine-like processes; interior cellules large and empty; exterior minute, coloured, angular. *Fruct.*: 1, *ceramidia* (unknown); *stichidia* lanceolate, involute, scattered or tufted, containing a double row of tetraspores.—POLYPHACUM (*Ag.*), seemingly from πολυς, *many*, and φακος, *a lentil.*

Frons prolifera. Phyllodia plana, linearia, costata, utrinque verrucis spinulisque scaberrima; cellulis interioribus maximis hyalinis, exterioribus minutis coloratis angulatis. Fruct.: 1, *ceramidia* (*ignota*); 2, *stichidia lanceolata, apice involuta, sparsa v. cæspitosa, tetrasporas triangule divisas duplici serie foventia.*

POLYPHACUM *proliferum*; wart-like processes very minute, stipitate, spinulose; stichidia densely cæspitose, confined to the apices of the phyllodia.

P. proliferum; *verrucis minutis stipitatis spinuliferis; stichidiis dense cæspitosis apicem frondis coronantibus.*

POLYPHACUM proliferum, *Ag. Syst. p.* 274. *Grev. Syn. p.* xxxvi. *Endl. Syn. p.* 33. *Sond. Bot. Zeit.* 1845, *p.* 54. *Pl. Preiss. v.* 2. *p.* 185. *Harv. Ner. Austr. p.* 17; *Alg. Austr. Exsic. n.* 150. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 537.

OSMUNDARIA prolifera, *Lamx. Ess. t.* 1. *Dcne. Voy. Venus, ined. cum icone eximia.*

HAB. New Holland, *Lamouroux.* Western Australia, *Preiss.* At Fremantle, *G. Clifton.* King George's Sound, *W. H. H.*

GEOGR. DISTR. Western and south-western Australia.

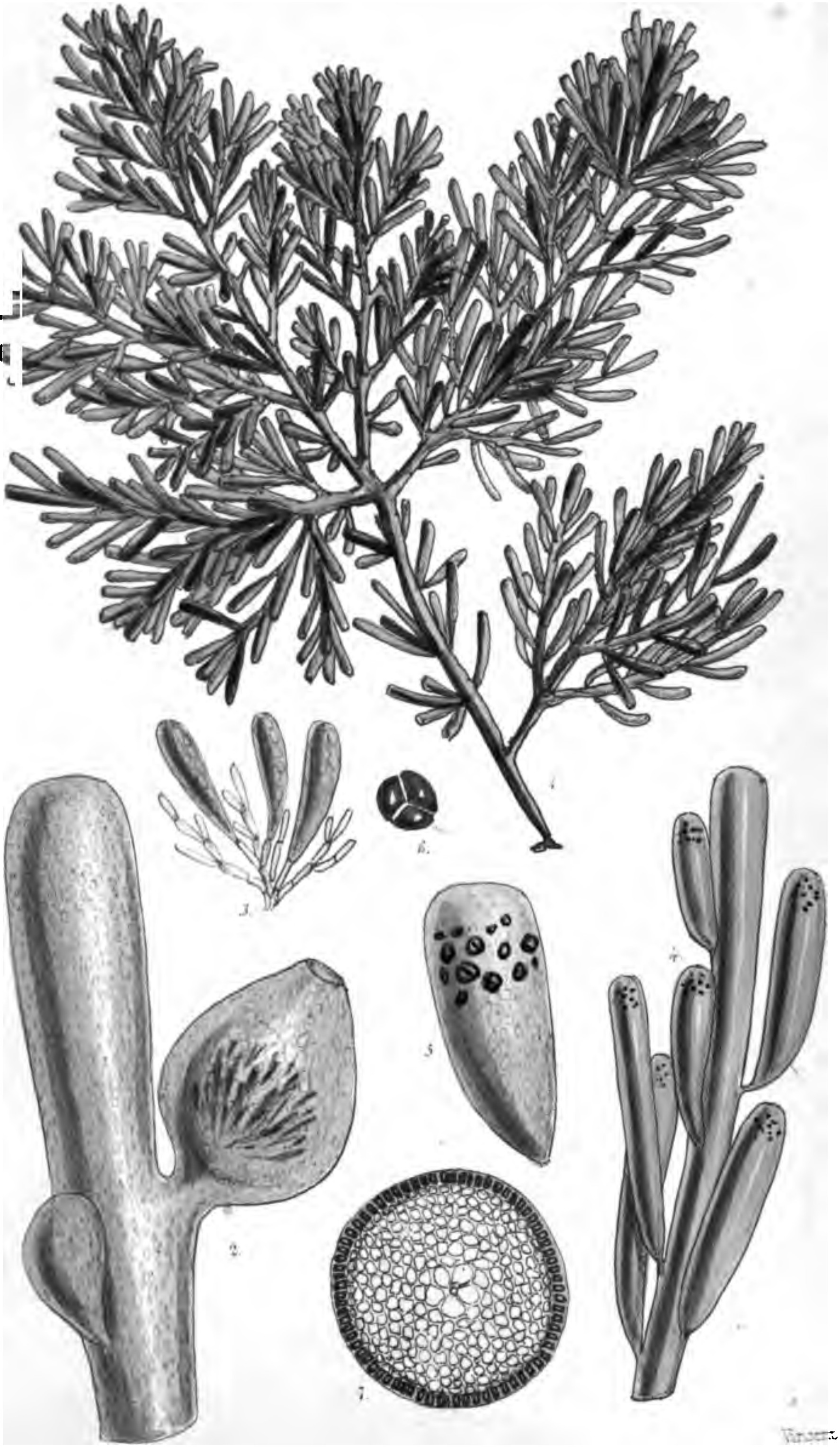
DESCR. *Root* an expanded callus. *Stem,* in old fronds, one, two, or more inches long, cylindrical below, rigid and ligneous, becoming compressed upwards and passing into the tapering base of a narrow-linear, thick, coriaceous, opaque, very obtuse or emarginate *phyllodium,* which is 3–6 inches long, and generally 4–5 lines wide. From the midrib, and often from the apex, of the primary phyllodium, spring others of similar form and texture; and these emit others similar to themselves but smaller; and thus, at length, a proliferously much-branched frond, 1–2 feet in expansion, may be formed. All the phyllodia are very closely covered, on both sides, with minute, spiniferous processes, giving to the surface the rough feel of shagreen when dry, and somewhat that of a rigid sponge when moist. Such is the common state of the plant; but states occur (see Fig. 2) in which the warted phyllodia emit perfectly smooth, thin, membranous, serrated, and transversely striate leaves, resembling those of a *Dictymenia*. The young, nascent frond has not been observed. *Stichidia* occur in several stipitate, slightly separated tufts, forming a crown to the phyllodia; they are lanceolate, inrolled at the point, and contain a double row of tetraspores. The *colour*, when growing, is a very dark purple-red; when dry, either brown or black, without gloss. The *substance* is coarse; leathery when growing, rigid when dry, in which state the plant does not adhere to paper.

A remarkable plant, first described by Lamouroux, under a name which has been perhaps too fastidiously laid aside, because it transgressed a Linnæan canon; a canon, however, to which modern botanists pay so little regard that it may be said to be almost abolished by common consent.

At Fig. 2, 3, 4, I have represented a state of this species not previously noticed, but of which I collected several specimens at King George's Sound. These specimens seem to throw light on the early development of the frond, and would lead us to infer that, in a very young condition, it had all the characters of a *Dictymenia*, and therefore that it should be considered rather as a remarkable form of that genus than as a separate type of structure. If this be so, we should have an instance among the Algæ of a condition something similar in idea to that of the Australian *Acaciæ*, which produce true leaves on the young plant, but after a certain stage of growth, nothing ordinarily but *phyllodia*.

Fig. 1. POLYPHACUM PROLIFERUM. 2. Fragment of a leaf-bearing specimen:—both *the natural size*. 3. Portion of one of the leaves of Fig. 2. 4. Cross section of the same. 5. Portion of the apex of a fertile *phyllodium*, with tufts of stichidia. 6. A stichidium. 7. A tetraspore:—*magnified*.

Plate [illegible]



Vincent B

PLATE CLXXXIX.

CHONDRIA CLAVATA, *Harv.*

GEN. CHAR. *Frond* filiform, cartilaginous, dendroid, opaque, coated with small, polygonal, irregularly placed cells. *Axis* articulated, polysiphonous. *Ramuli* clavæform, much constricted at their insertion. *Fructification:* 1, ovate *ceramidia;* 2, tripartite *tetraspores,* formed irregularly in the clavate ramuli.—CHONDRIA (*Ag.*), χονδρος, *cartilage.*

Frons filiformis, cartilaginea, dendroidea, opaca, cellulis irregularibus polygonis corticata. Axis articulatus, polysiphonius. Ramuli clavati, basi constricti. Fruct.: 1, *ceramidia ovata;* 2, *tetrasporæ triangule divisæ, in ramulis immersæ, sparsæ v. irregulariter aggregatæ.*

CHONDRIA *clavata;* frond terete, juicy, blood-red, robust, irregularly branched; branches spreading toward all sides, undivided, beset with lateral branches and ramuli; ramuli opposite, tufted or scattered, often incurved, cylindrical, very obtuse, much constricted at base, or stipitate; ceramidia ovate, lateral, shortly pedicellate; tetraspores in the apices of the ramuli.

C. clavata; *fronde tereti succosa sanguinea robusta vage ramosissima; ramis quoquoversum egredientibus indivisis ramis lateralibus ramulisque onustis; ramulis oppositis fasciculatis v. sparsis sæpius incurvis cylindraceis obtusissimis basi valde constrictis v. stipitatis, ceramidiis ovatis brevissime pedicellatis, tetrasporis sub apice ramulorum nidulantibus.*

LAURENCIA clavata, *Sond. in Linn. v.* 25. *p.* 694.

CHONDRIA corynephora, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 539; *Alg. Austr. Exsic. n.* 159.

HAB. Lefèbre Peninsula, *Dr. Mueller.* Abundant at Garden Island, Western Australia, at Port Riche, Port Fairy, etc., *W. H. H.* Fremantle, *G. Clifton.*

GEOGR. DISTR. Western and southern coasts of Australia.

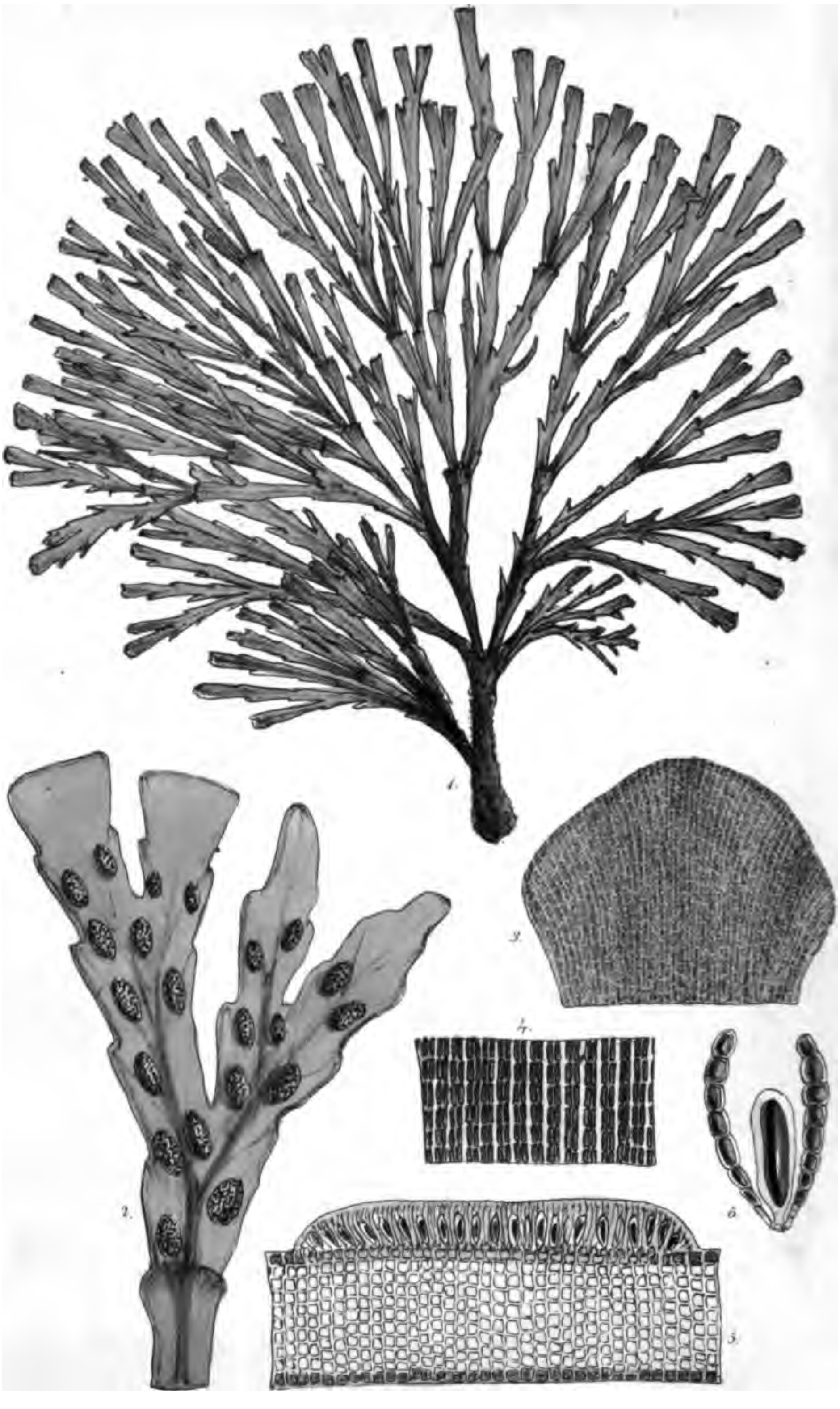
DESCR. *Root* discoid, sometimes branching. *Frond* 5–8 inches high, the stem and branches nearly a line in diameter, terete, very much, but very irregularly branched, once, twice, or thrice compounded, and thickly covered with irregularly inserted, almost imbricating ramuli. The *branches* spread in every direction, and the general frond, when taken up fresh, is very bushy and tree-like. The *ramuli* are 5–18 lines long, succulent, a line or rather more in diameter, nearly cylindrical for their greater length, suddenly tapering to the base, very obtuse, and often incurved; they are more or less abundant, and very irregularly inserted, frequently clustered, sometimes scattered, and sometimes opposite or whorled; they fall off very readily when the frond is thrown into fresh-water. *Ceramidia* rare, lateral on the ramuli, scarcely sessile, ovate, with a narrow aperture. *Tetraspores* near the ends of the ramuli. The *colour* is a deep blood-red, becoming brighter and more rosy in drying; or, if not sufficiently washed in fresh-water, darkening and becoming more brown. The *substance* is juicy, but crisp and firm, and very fragile; in drying the plant firmly adheres to paper.

In several respects this is allied to *C. dasyphylla*, a species common to Europe and Australia, but *C. clavata* is much more robust, more densely branched, of brighter colour, and very fragile; the ramuli falling off very soon after the plant is plunged in fresh-water.

When I described it formerly, under another name, I was not aware that it had been previously named and published by my friend Sonder, from specimens collected by Dr. Mueller.

Fig. 1. CHONDRIA CLAVATA,—*the natural size.* 2. Apex of a ramulus, with a *ceramidium.* 3. Spores. 4. Ramuli, bearing tetraspores. 5. One of the younger, fertile ramuli. 6. A tetraspore. 7. Cross-section of the frond:—*magnified.*

Plate CXC.



Vincent Brooks, Imp.

Plate CXC.

ZONARIA INTERRUPTA, *Ag.*

Gen. Char. *Root* woolly. *Frond* flat, ribless, coriaceo-membranaceous, flabelliform, entire or vertically multifid; the surface-cellules set in longitudinal lines, radiating from the base of the segments. *Fructification: spores* superficial, collected in spot-like *sori*, and mixed with jointed paranemata.—Zonaria (*Ag.*), from *ζωνη, a zone* or *girdle;* because the frond, in many species, is marked with distant, concentric lines.

Radix stuposa. Frons plana, ecostata, coriaceo-membranacea, flabellata, integra v. multisecta; cellulis superficialibus in lineas longitudinales e basi laciniarum radiantes ordinatis. Fruct., sporæ in soros maculiformes collectæ, paranematibus articulatis stipatæ.

Zonaria *interrupta;* erect; stem terete or winged, elongate, woolly, branching; branches ending in deeply parted, basally woolly laminæ, whose segments are narrow-linear, truncate, sparingly toothed or incised, and here and there irregularly constricted; apices lineari-cuneate, radiately striate; sori oblong, scattered.

Z. interrupta; *erectiuscula, stipite terete v. alato elongato stuposo ramoso; ramis in laminas profunde partitas inferne stuposas abeuntibus eorum laciniis anguste linearibus truncatis parce dentatis incisisve hic illic constrictis; apicibus lineari-cuneatis radiatim striatis; soris oblongis sparsis.*

Zonaria interrupta, *Ag. Sp. Alg. v.* 1. *p.* 137; *Syst. p.* 268. *Suhr, Eckl. t.* 1. *f.* 5. *Harv. in Hook. Fl. Nov. Zel. v.* 2. *p.* 218. *Hook. Fl. Tasm. v.* 2. *p.* 290.

Dictyota interrupta, *Lamour. Ess. p.* 57. *t.* 12. *f.* 1.

Phycopteris interrupta, *Kg. Phyc. Gen. p.* 341. *Sp. Alg. p.* 564.

Fucus interruptus, *Turn. Hist. t.* 245.

Hab. Port. Phillip Heads, *W. H. H.* Tasmania, *Labillardière, Gunn, etc.*

Geogr. Distr. South coasts of Australia. Tasmania. New Zealand. Cape of Good Hope. Madagascar, *Commerson.*

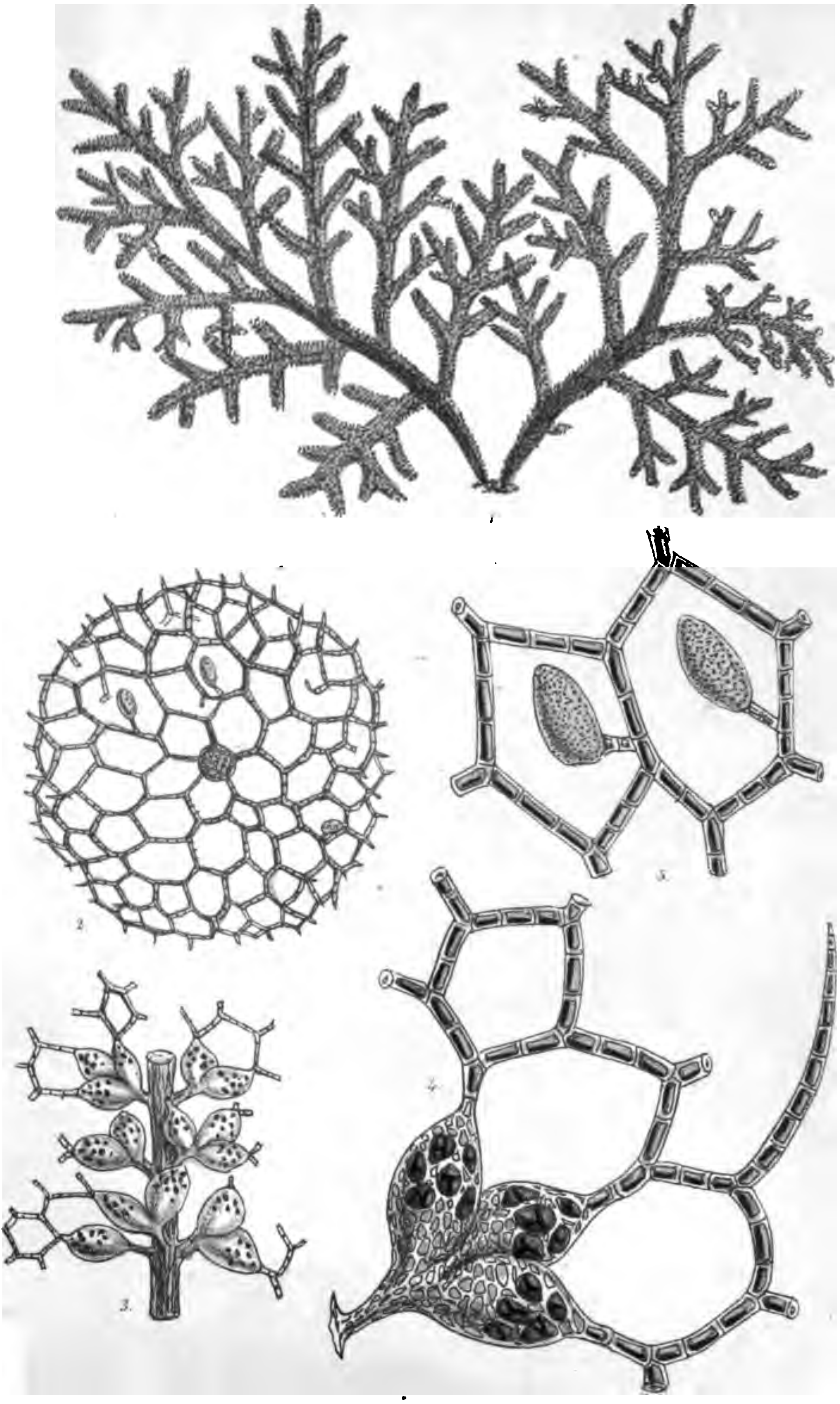
Descr. *Root* a broad callus, thickly clothed with woolly, entangled, foxy fibres. *Fronds* tufted, 4–6 inches long, much divided, fastigiate, in outline more or less flabelliform. *Stipes* elongate, the young one winged, the older terete, well coated with woolly, curled fibres, which extend as a tomentum over the bases of the laminæ that terminate the branches. Branches vaguely divided, somewhat dichotomous, vertically cleft nearly to the base into numerous narrow-linear, simple, bifid or trifid segments, these are 1–1½ inches long, cuneate at the tips and subtruncate, here and there toothed along the sides and constricted, the strictures generally marked by a zone, indicating a former stoppage of growth or of apex. *Substance* thick, opaque, coriaceous.

Colour dark-olive-brown, fading on exposure to a dull amber or yellowish-horn colour. *Sori* are abundant in our Australian specimens. In drying the frond does not adhere to paper.

* * *

A widely distributed species, abundant on several parts of the Australian coast, as well as in South Africa and New Zealand. Herbarium specimens often vary much in colour, but when growing, the frond is uniformly dark-brown.

Fig. 1. ZONARIA INTERRUPTA,—*the natural size.* 2. Laciniæ, from a fertile frond, with *sori.* 3. Apex of a lacinia, showing surface cells. 4. Portion of the same. 5. Section through frond and *sorus.* 6. A *spore* and two *paranemata*:—more or less *magnified.*



Vincent Brooks Imp.

PLATE CXCI.

THURETIA TERES, *Harv.*

GEN. CHAR. *Frond* stipitate; stipes filiform, inarticulate, branched; the branches bearing pinnatifid, compressed or flattened, midribbed and penninerved *networks,* formed of confervoid, anastomosing ramelli. *Fructification:* 1, urceolate *ceramidia,* springing from the midribs of the network, and containing a tuft of pear-shaped spores; 2, subglobose *stichidia,* sessile on the lateral nerves of the network, containing tripartite tetraspores.—THURETIA (*Dne.*); worthily dedicated to M. Gustave Thuret, one of the ablest and most successful investigators of the physiology of the Algæ.

Frons stipitata; stipes filiformis, inarticulatus, ramosus; ramis in reticula compressa v. applanata costata et penninervia, e filis confervoideis anastomosantibus formata exeuntibus. Fruct.: 1, *ceramidia urceolata, ex costis reticuli enata, fasciculum sporarum pyriformium continentia;* 2, *tetrasporæ triangule divisæ, in stichidiis subglobosis ad nervos sessilibus evolutæ.*

THURETIA *teres;* network compresso-terete, bi-tripinnatifid; laciniæ linear, cylindrical, obtuse, without lateral nerves; articulations twice as long as broad; stichidia ovoid, binate or ternate, springing from the midrib, their prolonged apices passing into the threads of the network.

T. teres; *reticulo compresso-tereti bi-tripinnatifido; laciniis linearibus cylindraceis obtusis enerviis; articulis diametro subduplo longioribus; stichidiis ovoideis binatis v. ternatis pedicellatis, e costa exeuntibus, eorum apicibus in fila reticuli transeuntibus.*

THURETIA teres, *Harv. Alg. Austr. Exsic. n.* 114.

HAB. South Astralia, *Dr. Curdie.* Port Fairy and Port Phillip Heads, *W. H. H.*

GEOGR. DISTR. South coast of Australia.

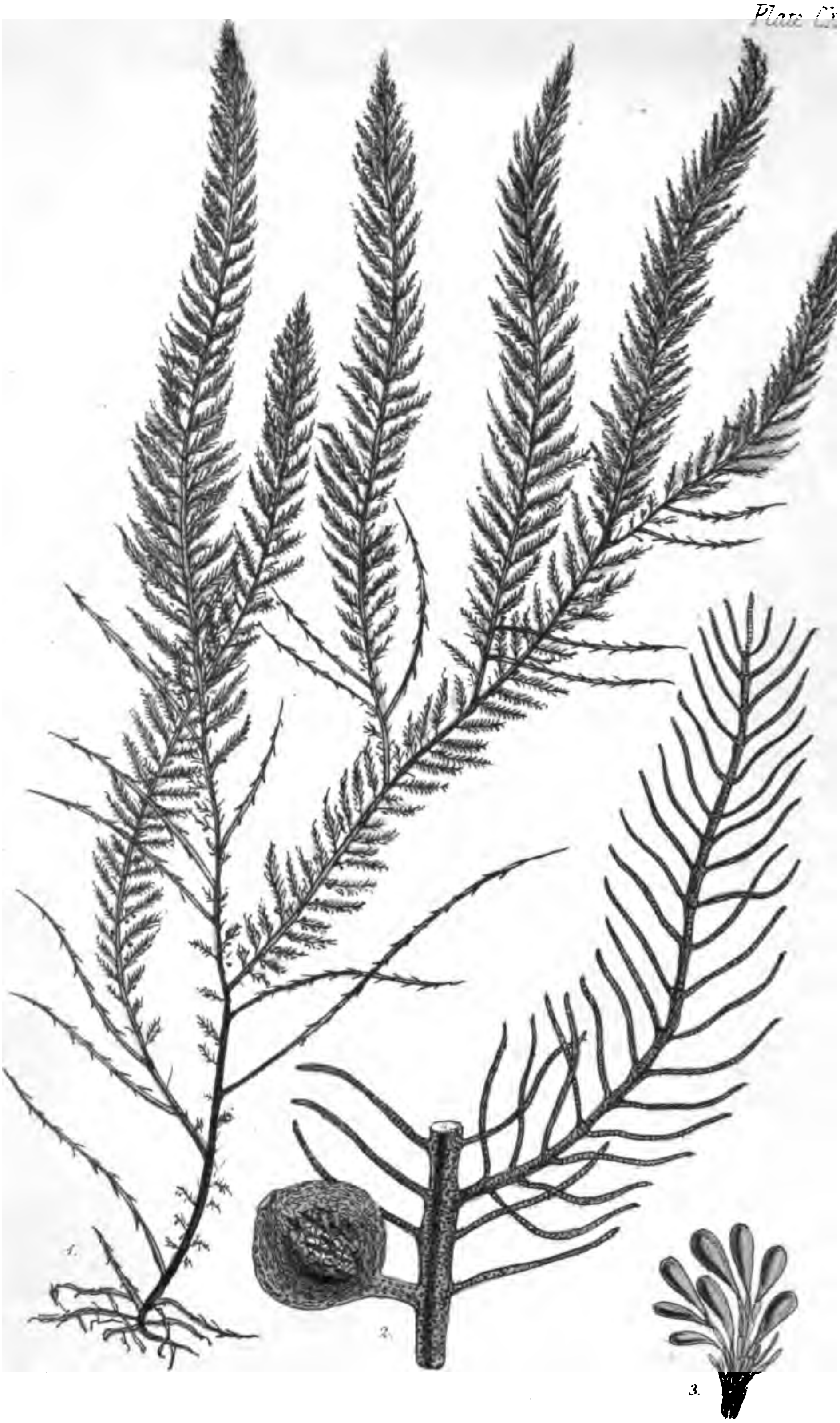
DESCR. *Root* spongy. *Fronds* densely tufted, 2–4 inches high, and as much in the expansion of the branches, bi-, tri-, or pluri-pinnatifid, the laciniæ varying from one to three lines in diameter, terete or compressed. Each frond consists of a percurrent, continuous axis or main filament, which emits lateral, distichous, opposite or alternate branches; this axis and its branches are whorled throughout with closely placed confervoid *ramelli,* which spread horizontally; these ramelli are formed on a dichotomous type, but their branches anastomose continually into the meshes of a loose, spongy network, which thus imperfectly encloses the axis, and constitutes the visible frond. The apices of the ramelli are free, and project from the surface of the spongy branches of the network. No *ceramidia* have yet been observed. The *stichidia* are developed in the bases of the anastomosing ramelli, constituting the net, a little above the point where these issue from the axis; they are ovoid, or shortly fusiform, two or three growing together, and each contains a few large, irregularly placed tetraspores. *Antheridia* are formed on *free* processes of the ramelli, at uncertain points of the network; they are oval, containing minute granules. The *colour* is a pale rose-red, soon discharged, and fading in the herbarium to a dirty red-brown. The *substance* is membranous, not gelatinous, and the frond closely adheres to paper in drying.

* * *

Though this plant does not strictly agree in structure with *Thuretia quercifolia,* it accords in so many principal points that I prefer placing it in the genus *Thuretia* to founding a new genus for its accommodation. The chief points of contrast are the perfectly flat penninerved network of *T. quercifolia,* and the terete and obsoletely nerved network of the present species, and the shape and relative position of the stichidia. In *T. teres* the stichidia seem to spring directly from the principal axis, instead of from the lateral nerves; but this can hardly be considered a generic distinction, for it relates merely to the greater or less branching of the axis. No *ceramidia* have yet been found on *T. teres,* but some of my specimens produce an abundance of what I suppose to be *antheridia,* as represented Fig. 5.

Fig. 1. THURETIA TERES,—*the natural size.* 2. Cross section of one of the smaller branches of the network. 3. Portion of a fertile costa, bearing *stichidia.* 4. Ternate stichidia and base of network. 5. Portion of network bearing antheridia:—variously *magnified.*

Plate C



Vincent Brooks Imp.

PLATE CXCII.

ASPARAGOPSIS ARMATA, *Harv.*

GEN. CHAR. *Frond* filiform, inarticulate, thyrsoideo-paniculate; branches penicillate, pinnately decompound, the ultimate ramelli setaceous, laxly cellular (not articulate). *Fructification:* 1, ovate, pedunculate *ceramidia,* containing, within a membranous pericarp, a dense tuft of pear-shaped spores; 2, *tetraspores . . . ?*—ASPARAGOPSIS (*Mont.*), from *asparagus,* the well-known vegetable so called, and *οψις, a resemblance.*

Frons filiformis, inarticulata, filo articulato monosiphonio percursa, thyrsoideo-paniculata. Rami (breves) penicillati, pinnatim decompositi et in ramellos setaceos laxe cellulosos soluti. Fruct.: 1, *ceramidia pedunculata, a ramulo transformata, intra pericarpium membranaceum poro pertusum sporarum fasciculum foventia; fila sporifera ramosissima. Tetrasporæ ignotæ.*

ASPARAGOPSIS *armata;* stems rising from ultrasetaceous, branching rhizomes, erect or climbing, irregularly much branched, clothed with ramelli nearly to the base; branches linear-lanceolate (in outline), virgate, armed at base with 2–3, approximate, naked, retrorsely spinous branchlets; ceramidia globose, on cylindrical peduncles.

A. armata; *surculo ultrasetaceo parum ramoso repente caules plures emittente; caulibus erectis v. scandentibus vage ramosissimis per totam fere longitudinem ramulis ramelliferis onustis; ramis secundariis virgatis circumscriptione lineari-lanceolatis basi sæpissime ramulis 2–3 nudis retrorsum aculeatis instructis; ceramidiis globosis, pedunculo cylindraceo.*

ASPARAGOPSIS armata, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 544; *Alg. Austr. Exsic. n.* 242; *Fl. Tasm. v.* 2. *p.* 305.

ASPARAGOPSIS Delilei (*excl. syn.*), *Harv. Ner. Austr. p.* 88. *t.* 35 *(not characteristic); Fl. Nov. Zel. v.* 2. *p.* 233.

HAB. Common along the western and southern coasts. Newcastle, New South Wales, *W. H. H.* Tasmania, *Gunn, etc.*

GEOGR. DISTR. Australia. Tasmania.. New Zealand.

DESCR. *Fronds* springing from a loosely entangled mat of branching, naked, root-like, prostrate or creeping rhizomes, which are as thick or twice as thick as hog's-bristle. *Stems* numerous, 6–12 inches long or more, rarely quite simple, alternately branched or much branched, and often entangled; both the main divisions and the lesser branches clothed nearly to the base with short, penicillate branchlets, and each also armed below with two or three long, naked, patent or arching branchlets, set with alternate reflexed prickles. The penicillate *branchlets* are from half an inch to an inch in length, decompound-pinnate, all the divisions opposite, and their general outline is ovato-lanceolate and acute. The ultimate *ramelli* are of cobwebby fineness, laxly cellular, but not truly articulate. The *ceramidia,* as large as poppy-seed, are globose, on cylindrical, short or long peduncles, and are generally placed two or three together, near the base of the penicillate branchlets; they contain a very large nucleus, of dark red colour, consisting of pear-shaped spores on branching spore-threads. The *colour* is a pale or bright purplish rose-red, fading to orange and yellow, and turning rather darker, or brownish in drying. The *substance* is very soft and flaccid, but not gelatinous, and bears immersion in fresh-water for a considerable time without injury. In drying the frond adheres closely to paper.

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A very abundant species along the whole southern coast, often growing about the edge of low-water, though occurring in greater plenty and luxuriance at a greater depth, whence it is cast ashore in large, tangled tufts. It is much less robust, and much more copiously branched than *A. Sanfordiana* (Tab. VI.), of a paler colour, and the ends of the branches (taken with relation to the ramuli that clothe them) are more taper and acute or acuminate. A characteristic feature also of our present plant is the numerous naked lower branches set with retrorse hooks, by which it lays hold on neighbouring Algæ, and which cause the fronds in large tufts to become intricately connected together. Perhaps it should be regarded more as an exaggerated form of *A. Delilei*, with which I formerly confounded it, than as a distinct species. However this may be, it is unquestionably distinct from *A. Sanfordiana*, of which species I have recently received from Mr. Clifton magnificent specimens, much finer than those figured.

Fig. 1. ASPARAGOPSIS ARMATA,—*the natural size.* 2. Base of one of the penicillate branchlets, with a *ceramidium* and one of the pinnules. 3. Spores:—both *magnified.*
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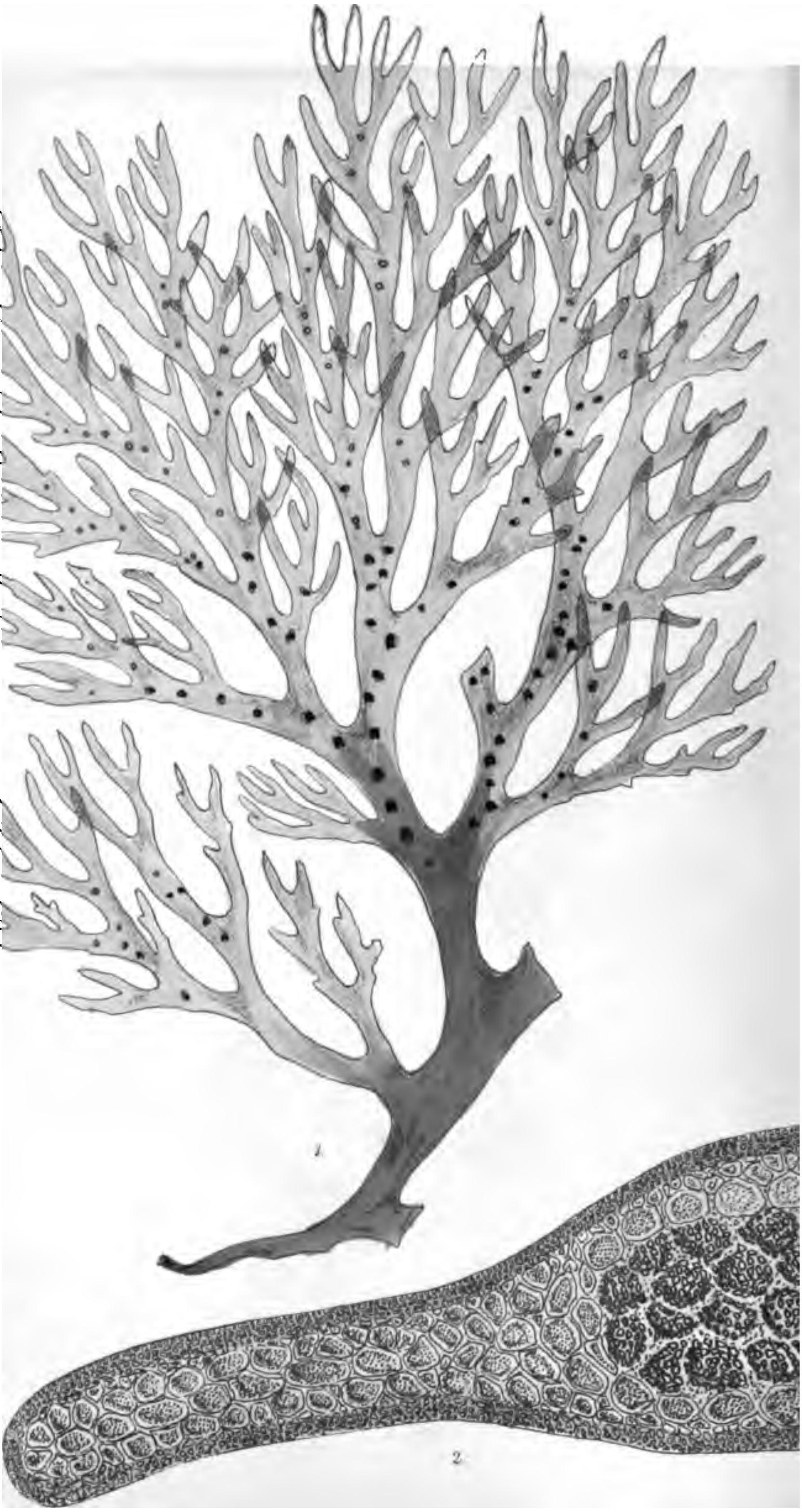
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Plate CXCIII.

CALLOPHYLLIS OBTUSIFOLIA, *J. Ag.*

Gen. Char. *Frond* carnoso-membranaceous, flat, dichotomous, formed of two strata of cells; the *medullary* stratum of large, roundish cells, separated by a network of anastomosing cellules; the *cortical* of vertical, moniliform filaments. *Fructification:* 1, half-immersed or superficial, frequently marginal *conceptacles*, containing within a thick, closed pericarp, a compound nucleus, consisting of several nucleoli or masses of spores; 2, cruciate tetraspores, dispersed through the cortical layer.—Callophyllis (*Kütz.*), from καλος, *beautiful*, and φυλλον, *a leaf.*

Frons carnoso-membranacea, plana, dichotoma, stratis duobus contexta; strato medullari cellulis magnis rotundatis reticulo cellularum anastomosantium cinctis, corticali filis verticalibus moniliformibus constante. Fruct.: 1, *cystocarpia semi-immersa v. superficialia, sæpius marginalia, intra pericarpium crassum clausumque nucleolos sporarum plures foventia;* 2, *tetrasporæ sparsæ, cruciatim divisæ.*

Callophyllis *obtusifolia;* frond dichotomously multipartite, subfastigiate, flat and entire at the margin; segments linear-cuneate, with obtuse axils, the terminal tapering into a blunt point; conceptacles scattered over the surface.

C. obtusifolia; *fronde dichotome multipartita subfastigiata margine plana et integerrima; segmentis cuneato-linearibus axillis obtusis, terminalibus versus apicem attenuatis obtusis; cystocarpiis disco frondis immersis.*

Callophyllis obtusifolia, *J. Ag. Sp. Alg. v.* 1. *p.* 297. *Harv. Alg. Austr. Exsic. n.* 403.

Callophyllis australis, *J. Ag. Alg. Liebm. p.* 13.

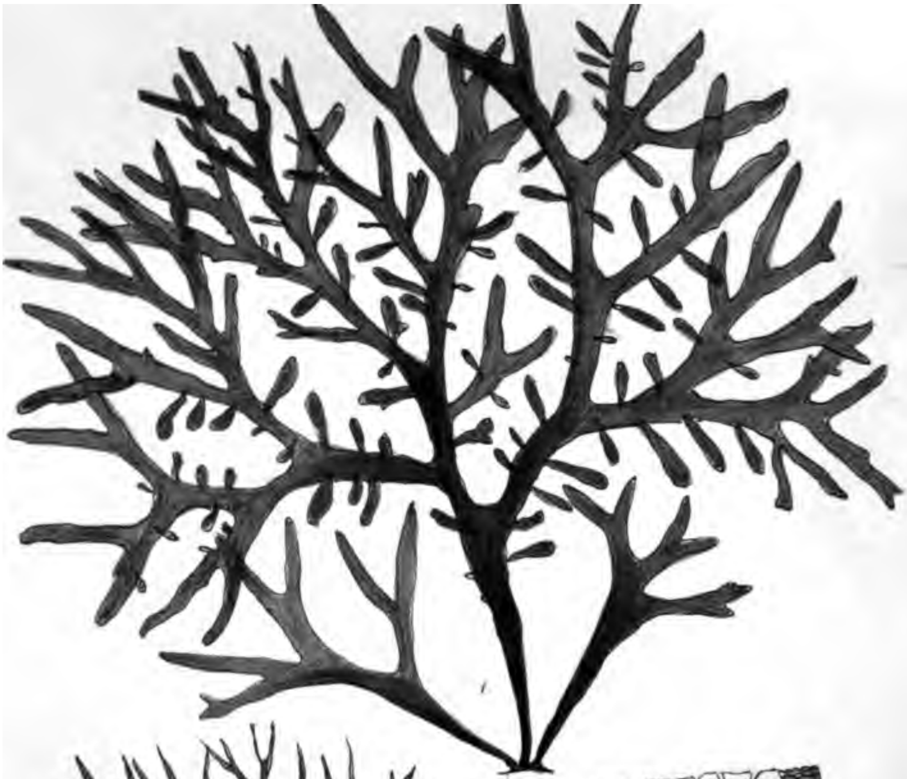
Hab. Southern Ocean, *Liebmann.* Philip Island, Western Port, *W. H. H.*, rare.

Geogr. Distr. South coast of Australia.

Descr. *Root* a small disc. *Frond* 8–12 inches long, and as much in the expansion of the branches, 3–5 lines wide, very much divided dichotomously, the larger segments somewhat fastigiate. The segments, whether broad or narrow, are linear-cuneate, with rounded and broadish axils; the uppermost divisions are gradually narrower, and the tips taper slightly to a blunt or subacute point. The *conceptacles* are plentifully scattered over the disc of the frond, and immersed in its substance, being prominent toward both sides; their nucleus consists of numerous closely packed nucleoli. The *colour* is a brilliant rosy- or blood-red. The *substance* is thickly membranous, soft, glossy when dry, and the frond in drying adheres closely to paper.

The description of *C. obtusifolia* given by Agardh so well agrees with the few specimens which I collected of this apparently rare species, that I have little or no hesitation in referring to his work, though I have seen no authentic specimen, nor has he stated the locality from which his plant was obtained. His statement that what he wished to describe bears a general resemblance to the figure of *Gracilaria multipartita,* given in Phyc. Brit., applies equally well to our plant, and further confirms me in the reference to Agardh. Though with a general resemblance to the common *C. coccinea,* it is much more regularly branched, has differently placed cystocarps, etc.

Fig. 1. CALLOPHYLLIS OBTUSIFOLIA,—*the natural size.* 2. Section through part of the lamina, and half a conceptacle,—*magnified.*



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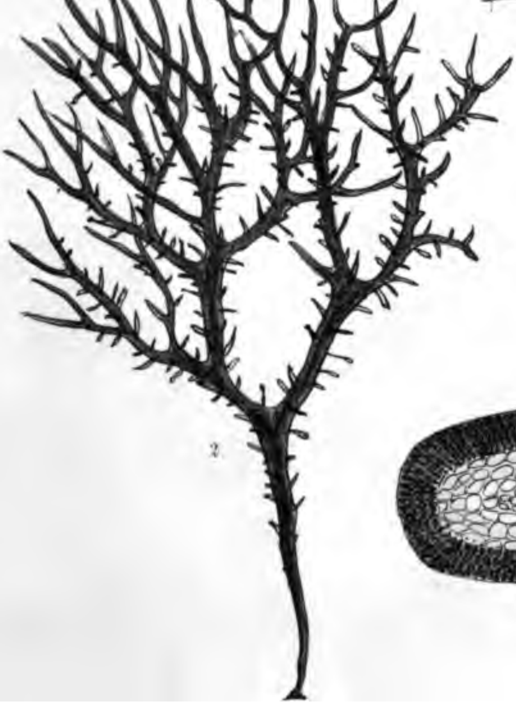

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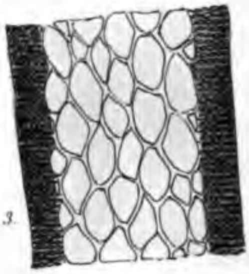

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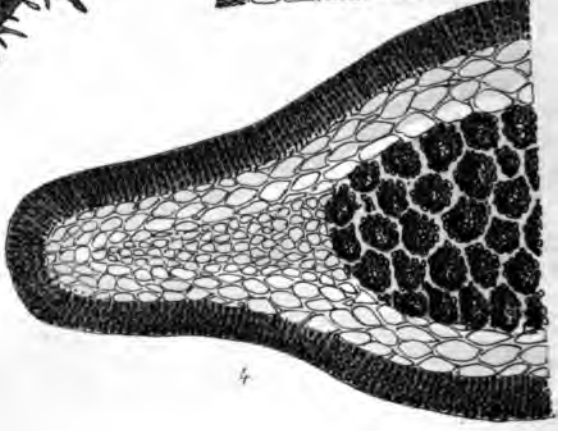

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PLATE CXCIV.

GYMNOGONGRUS FOLIOSUS, *Harv.*

GEN. CHAR. *Frond* coriaceous, somewhat fleshy, nearly filiform or flat, dichotomous, fastigiate, formed of two strata of cells; the *medullary* stratum of roundish-angular cells, the *cortical* of moniliform, vertical filaments, set in gelatine. *Fructification:* 1, immersed *conceptacles*, more or less prominent, composed of several nucleoli of spores aggregated in a compound nucleus; 2, external *nemathecia* (or warts), formed of radiating filaments, whose cells at maturity are changed into cruciate tetraspores.—GYMNOGONGRUS (*Mart.*), from γυμνος, *naked*, and γογγρος, *a wart-like excrescence on trees.*

Frons carnoso-coriacea, teretiuscula aut plana, dichotomo-fastigiata, stratis duobus cellularum constituta; strato medullari cellulis rotundato-angulatis, corticali filis moniliformibus verticalibus muco cohibitis contexto. Fruct.: 1, *cystocarpia immersa, plus minus prominentia, clausa, nucleolis sporarum pluribus in nucleum compositum aggregatis constantia;* 2, *nemathecia externa, filis radiantibus demum in tetrasporas cruciatas solutis constituta.*

GYMNOGONGRUS *foliosus;* frond tufted, stipitate, flabelliform, flat and membranous, dichotomo-fastigiate, proliferous from the disc and margin; segments linear; axils patent; apices divaricate, attenuate; conceptacles mostly in the proliferous leaflets, solitary, prominent to both surfaces.

G. foliosus; *fronde cæspitosa stipitata flabelliformi plana membranacea dichotomo-fastigiata e margine et disco folioso-prolifera; segmentis linearibus; axillis patentibus; apicibus divaricatis attenuatis; cystocarpiis sæpissime in foliolis proliferis immersis solitariis in utraque pagina prominentibus.*

GYMNOGONGRUS foliosus, *Harv. Alg. Austr. Exsic. n.* 396.

HAB. Port Phillip Heads, and Western Port, abundant, *W. H. H.*

GEOGR. DISTR. Southern coast of Australia.

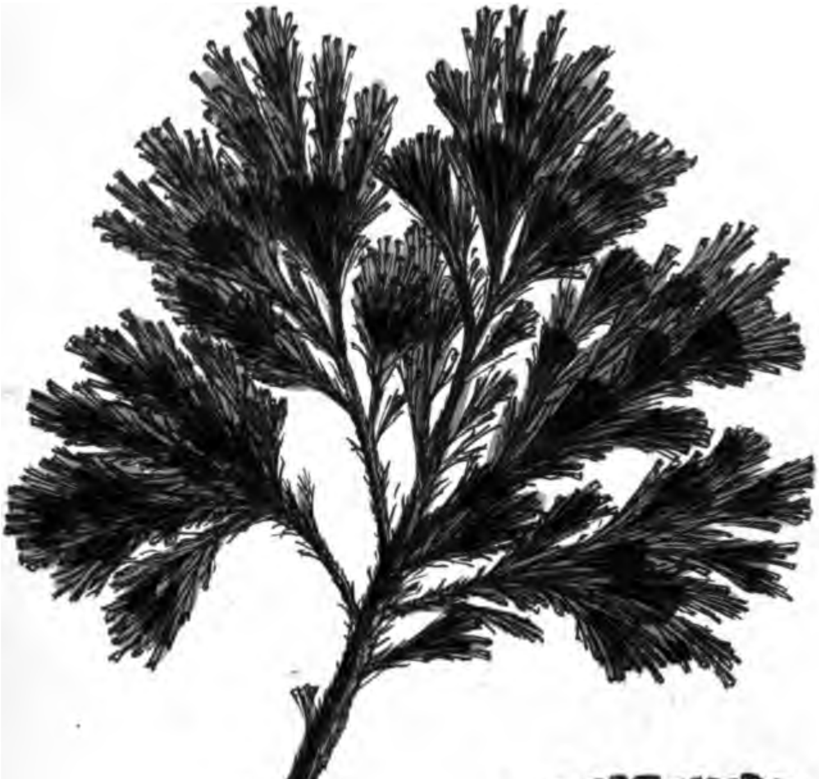
DESCR. *Root* a small disc. *Fronds* densely tufted, 4–6 inches high, 3–5 in the expansion of the segments, on a stipes ½–1½ inches high, quite flat, several times dichotomous, flabelliform and more or less fastigiate, all the segments spreading widely. The frond is seldom quite bare of ramenta or proliferous leaflets; commonly both margin and disc produce an abundance of linear, cuneate, or obovate, small, leaf-like processes. Some individuals have the segments 3–4 lines wide; in others they are scarcely a line in breadth; the narrower ones usually have the apices attenuate to a slender point. *Conceptacles* occur in the ramenta or leaflets usually near the tip; but one generally is found on each ramentum. The *colour* is a dark and

and red-brown or lurid-purple, varying in intensity with the depth of water. The substance is firm and somewhat rigid, more coriaceous than fleshy, and in drying the frond scarcely adheres to paper, or altogether refuses to adhere.

This is a variable species chiefly in the width of the segments, and in the greater or less abundance of the leafy marginal and discal processes. Some specimens are not unlike *Gracilaria corticata*, or some of the narrower forms of *Chondrus crispus*; but in many cases the tendency to form marginal leaflets is so excessive as to produce a densely crowded mass of segments, spreading in all directions.

Though the tetrasporic fruit has not yet been seen, there seems but little reason for doubting that this plant belongs to *Gymnogongrus*.

Fig. 1. GYMNOGONGRUS FOLIOSUS,—a broad variety. 2. The same, a narrow variety:—both of *the natural size*. 3. Longitudinal section of the frond. 4. Transverse section through frond, and half a conceptacle:—*magnified*.



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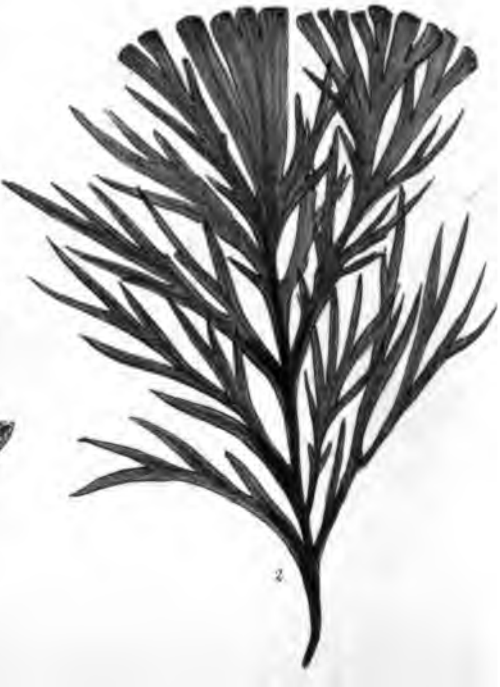

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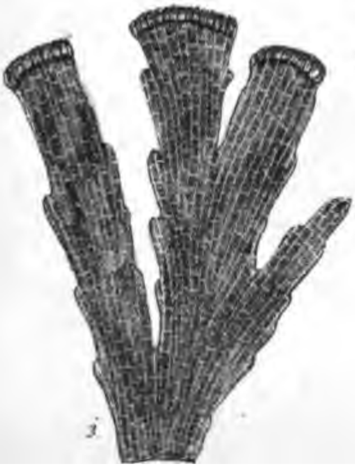

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Vincent Brooks Imp.

Plate CXCV.

ZONARIA MICROPHYLLA, *Harv.*

N. Char. *Root* woolly. *Frond* flat, ribless, coriaceo-membranaceous, flabelliform, entire or vertically multifid; the surface-cellules set in longitudinal lines, radiating from the base of the segments. *Fructification: spores* superficial, collected in spot-like *sori*, and mixed with jointed paranemata.—Zonaria (*Ag.*), from ζωνη, *a zone* or *girdle;* because the frond, in many species, is marked with distant concentric lines.

Radix stuposa. Frons plana, ecostata, coriaceo-membranacea, flabellata, integra v. multisecta; cellulis superficialibus in lineas longitudinales e basi laciniarum radiantes ordinatis. Fruct., sporæ in soros maculiformes collectæ, paranematibus articulatis stipatæ.

NARIA *microphylla;* frond erect, dendroid; stipes elongate, much branched, stupose; branches breaking up into very numerous, flabellulate, bipinnato-multifid and lacerate, glabrous segments; the apical laciniæ truncate, the lateral subulate, acute; zones inconspicuous.

Z. microphylla; *fronde erectiuscula dendroidea; stipite elongato ramosissimo stuposo; ramis in laminas numerosissimas angustissimas flabellatim bipinnatifido-multifidas glabras abeuntibus; lacinulis terminalibus truncatis, lateralibus subulatis acutis; zonis obsoletis.*

Zonaria microphylla, *Harv. Alg. Austr. Exsic. n.* 81.

AB. South Australia, *Dr. Curdie.* Port Fairy, *W. H. H.* Port Phillip Heads, *Dr. Mueller.*

EOGR. Distr. South coast of Australia.

ESCR. *Root* a broad callus, coated with curled hairs. *Frond* subsolitary, tree-like, branched toward all sides, 3–6 inches high and as much in the expansion of the branches. *Stipes* terete, 2–3 lines in diameter, elongate, much branched, coated to the ends of all the branches with foxy, curled hairs; densely beset along the sides with small flabelliform laminæ, and terminating in a dense fascicle of similar laminæ. These *laminæ* are scarcely half an inch long, very much cut, in a subpinnate manner, into shred-like laciniæ, less than half a line wide, the lateral ones subulate and very acute, the terminal truncate. *Zones* are obsolete; but the truncate apices are darkened and zoned as in others of the genus. *Fruit* has not been observed. The *colour* when growing is a dark olive-brown. The *substance* is rigid, and the plant does not adhere to paper in drying.

* * *

To the eye this plant bears considerable resemblance to coarse specimens of *Sphacelaria scoparia* in its denuded state; it is much more bushy and tree-like than any other *Zonaria,* and its laminæ, though formed on a flabelliform type, are so deeply cut into numerous slender shreds that they appear almost like tufts of filaments. In old fronds especially the distichous character is nearly lost by overcrowding.

It is far from uncommon on the exposed shores of Victoria, and seems to be sufficiently well marked specifically by its finely divided fronds.

Fig. 1. ZONARIA MICROPHYLLA,—*the natural size.* 2. One of the multifid segments or laminæ of the frond, *magnified.* 3. Apical laciniæ, more highly *magnified.*

Plate

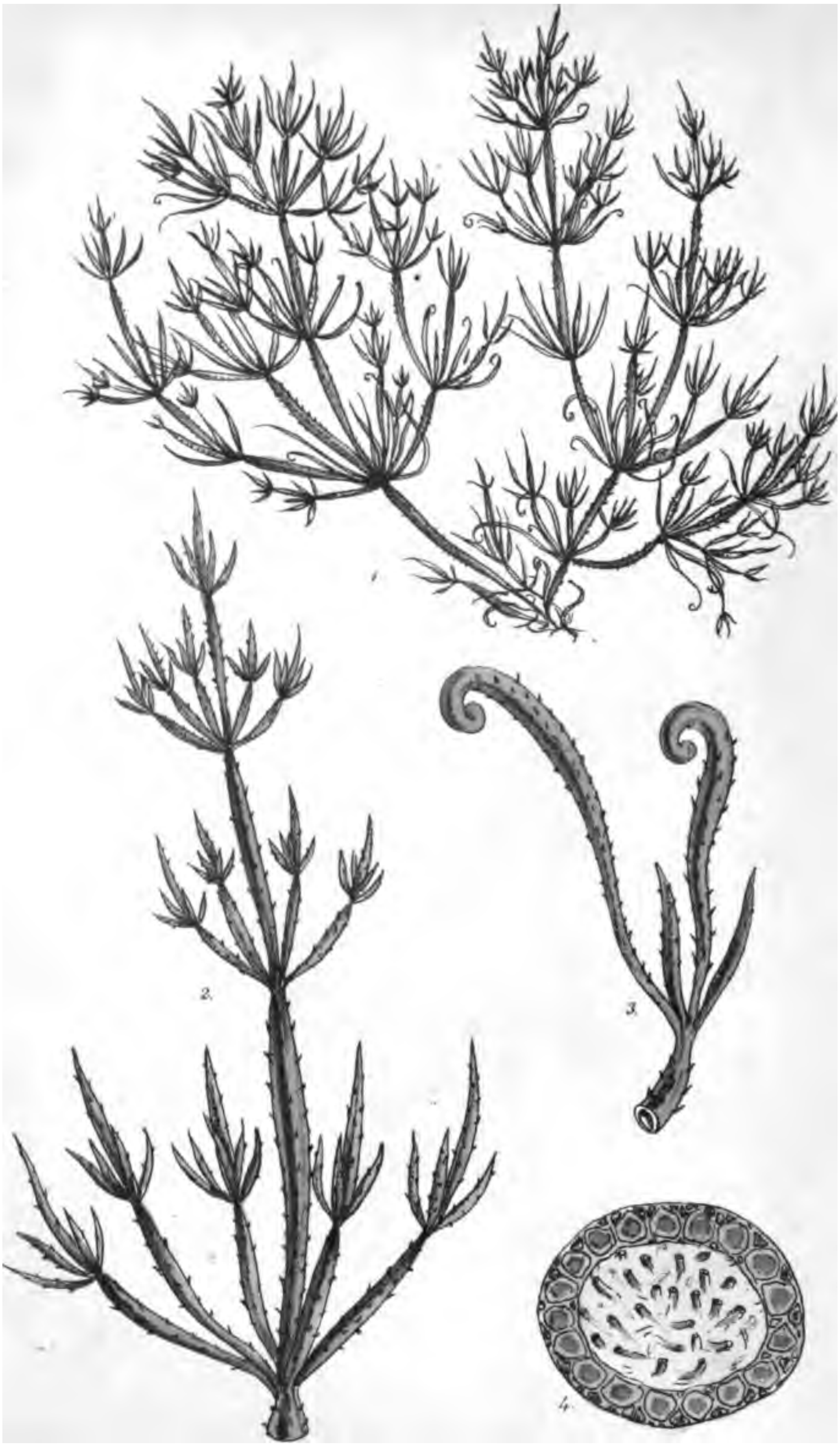


PLATE CXCVI.

RHABDONIA CHAROIDES, *Harv.*

GEN. CHAR. *Frond* filiform, decompound, imperfectly tubular; tube partly filled with longitudinal, branching and anastomosing filaments; peripheric stratum composed of polygonal cellules, smaller toward the circumference. *Fructification:* 1, *conceptacles* immersed in the branches, suspended among the axial filaments and enclosed in a network of filaments, containing moniliform strings of spores, radiating from a central placenta; 2, zonate *tetraspores* dispersed through the superficial stratum.—RHABDONIA (*Harv.*), from *ῥαβδος, a twig;* in allusion to the twiggy ramification of the species.

Frons filiformis, decomposite ramosa, tubulosa; tubo filis longitudinalibus ramosis anastomosantibus percurso; strato peripherico ex cellulis angulatis superficiem versus minoribus contexto. Fruct.: 1, *cystocarpia infra stratum periphericum suspensa, reticulo filorum velata, carpostomio demum aperta, fila sporifera moniliformia a placenta centrali emissa continentia;* 2, *tetrasporæ zonatim divisæ, per ramos minores sparsæ, immersæ.*

RHABDONIA *charoides;* frond flaccid, cæspitose, constricted at intervals into pseudo-joints, and whorled at the nodes with similarly constricted branches, which are whorled with ramuli; internodes of stem and branches fusiform, echinulate; ramuli taper-pointed, some occasionally cirrhous.

R. charoides; *fronde cæspitosa flaccida distanter articulato-constricta ad nodos ramis pseudo-articulatis verticillata; ramis ramulis verticillatis; internodiis fusiformibus echinulatis; ramulis utrinque attenuatis acutis nunc cirrhiformibus.*

ERYTHROCLONIUM charoides, *Harv. Alg. Austr. Exsic. n.* 393.

HAB. Port Phillip Heads, *W. H. H.*

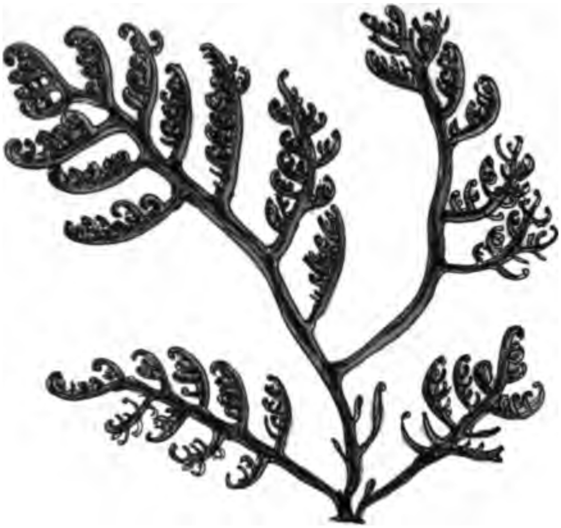
GEOGR. DISTR. Southern coasts of Australia.

DESCR. *Root* matted. *Fronds* densely tufted, 3–5 inches long, terete, slender, constricted at intervals of ½–1 inch into spurious articulations, and whorled at the node-like constrictions with branches and ramuli. The branches are themselves constricted at intervals and similarly whorled with lesser branches; and both large and small branches are at intervals whorled with slender, fusiform, acute or acuminate ramuli. Some of the ramuli occasionally are drawn out into long, involute tendrils, which clasp any object within reach. The periphery of the frond is composed of a single row of large cells, coated externally with a narrow border of much smaller cellules; the medullary stratum is lax, composed of comparatively few filaments, without any axile thread. No fruit has been noticed. The *substance* is soft, flaccid, and delicate, and the frond closely adheres to paper in drying. The *colour* is a rosy red, well preserved in the herbarium. The surface of the frond is very generally scabrous with minute, bristle-like points; in some specimens these are very abundant; in others few, and occasionally, but rarely, the frond is nearly smooth.

The habit of this plant is so completely that of an *Erythroclonium* (particularly of *E. angustatum*) that I had formerly placed it without hesitation in that genus, nor did I discover my error until, having made a cross cutting for the present Plate, I found that the axile filament which characterizes *Erythroclonium* was not present. The internal structure indeed is similar to that of the most typical *Rhabdonia;* and the constricted ramuli are not quite anomalous in the genus, something similar being found in *R. globifera* (Tab. CXXIX.). No fruit has yet been observed; and hence, perhaps, the genus may even yet be considered as doubtful. When I collected it, about Christmas, 1854, it was tolerably abundant among the drift-weeds within the Heads of Port Phillip, a locality where many other interesting Algæ may be found at the same season.

Fig. 1. RHABDONIA CHAROIDES,—*the natural size.* 2. Part of a branch, with whorled ramuli. 3. Cirrhous ramuli. 4. Cross section of the frond, more or less *magnified.*

Plate CXCVII.



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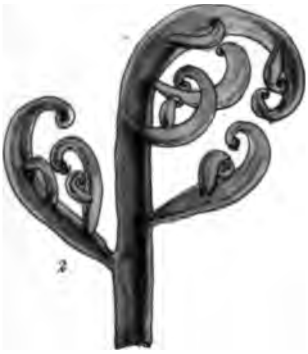

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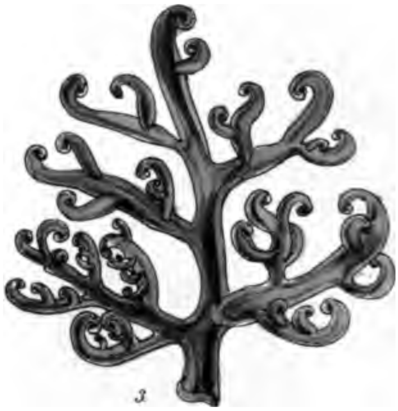

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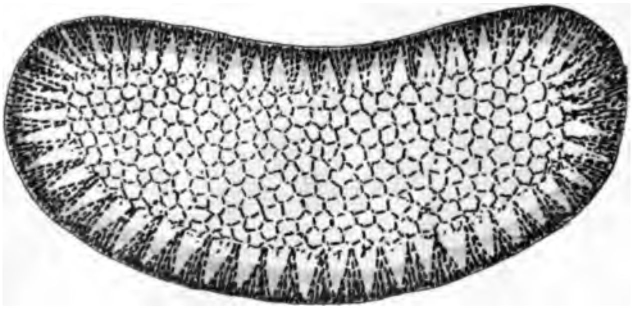

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PLATE CXCVII.

GIGARTINA ANCISTROCLADA, *Mont.*

GEN. CHAR. *Frond* carnoso-cartilaginous, flat or cylindrical, simple or variously branched, composed of two strata of cells; the medullary stratum, of cylindrical, articulated filaments, anastomosing into a very lax network; the cortical, of moniliform, vertical, dichotomous filaments set in firm gelatine. *Fructification:* 1, external, globose, finally perforate *conceptacles,* containing within a saccate *placenta* (?) formed of closely interwoven filaments, a compound *nucleus* consisting of many confluent *nucleoli,* or masses of roundish-angular spores; 2, cruciate *tetraspores,* collected into dense, subprominent sori, lodged beneath the superficial cells.—GIGARTINA (*Lamour.*), from *γιγαρτον, a grape-stone,* which the conceptacles resemble.

Frons carnoso-cartilaginea, plana v. cylindracea, ramosa, ex stratis duobus cellularum composita; stratum medullare ex filis tenuibus cylindraceis laxe anastomosantibus, corticale ex filis moniliformibus verticalibus dichotomis formatum. Fruct.: 1, *favellidia intra pericarpium externum carpostomio pertusum excepta, filis arachnoideis intertextis obvoluta;* 2, *tetrasporæ cruciatim divisæ, in soros subprominentes infra stratum corticale nidulantes plurimæ collectæ.*

GIGARTINA *ancistroclada;* frond channelled on one side, convex on the other, linear, irregularly bi-tripinnate, distichous, pinnæ alternate or subopposite, often secund, the apices of the branches and ramuli strongly hooked inwards.

G. ancistroclada; *fronde hinc convexa illinc canaliculata lineari vage bi-tripinnata disticha; pinnis alternis v. suboppositis sæpe secundis; apicibus omnibus uncinato-incurvis.*

GIGARTINA ancistroclada, *Mont. Prod. Phyc. Ant. p.* 6; *Voy. au Póle Sud, p.* 121. *t.* 7. *f.* 4. *Kütz. Sp. Alg. p.* 751. *J. Ag. Sp. Alg. v.* 2. *p.* 272. *Harv. Alg. Austr. Exsic. n.* 401. *Harv. in Hook. f. Fl. Tasm. v.* 2. *p.* 325.

HAB. Brown's River, Tasmania, *R. Gunn, Dr. Lyall.*

GEOGR. DISTR. Tasmania. New Zealand.

DESCR. *Root* discoid. *Frond* 2½–3 inches high, shortly stipitate, from a line to a line and half in breadth, linear, convex on one side, channelled by an inrolling of the margin on the other, pinnately branched or bi-tripinnate. *Pinnæ* often secund, sometimes fasciculate, but normally alternate, rarely subopposite, incurved or recurved, the lowest longest, the rest gradually shorter to the point. *Pinnules* more commonly secund than the pinnæ, in other respects similar. All the apices are strongly inrolled. *Colour* a dull brownish-purple, fading to horny and greenish, especially in exposed speci-

mens, and becoming dark-brown or black in drying. *Substance* cartilaginous, rigid when dry, in which state the frond does not adhere to paper. The *fruit* has not been observed.

This rare species is readily known from other Australian *Gigartinæ*, by its channelled stems and branches, and the strongly inrolled apices. In these characters it agrees with *G. alveata* of New Zealand, but differs from that species in being pinnately decompound and not dichotomous and fastigiate. Whether mere ramification in this case be a persistent character remains to be proved. It is not impossible that the same species may appear (as often takes place among Ferns) in a dichotomous and in a pinnated form; and I have sometimes feared that *G. flabellata* and *G. pinnata* were not permanently distinct. Should that be established, the present plant may then be, perhaps, regarded as a pinnated variety of *G. alveata*.

Fig. 1. GIGARTINA ANCISTROCLADA,—*the natural size.* 2, 3. Small portions of the frond, *enlarged.* 4. Transverse section, highly *magnified.*

Plate [illegible]

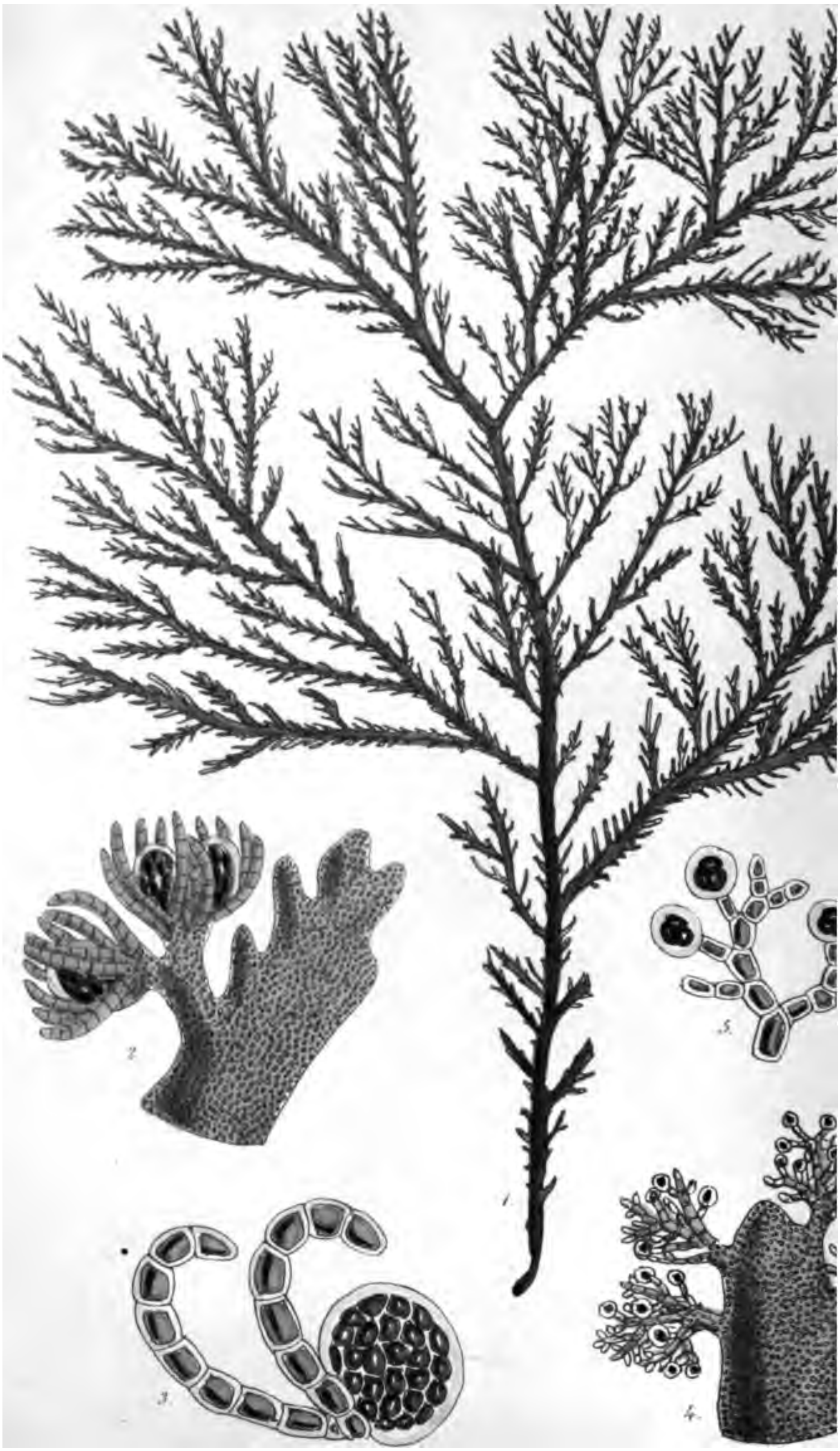

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Plate CXCVIII.

PTILOTA JEANNERETTII, *Harv.*

N. Char. *Frond* compressed or two-edged, distichous, pectinato-pinnate, inarticulate, with an articulate monosiphonous axis; the pinnules sometimes articulate. *Fructification:* 1, involucrate *favellæ,* containing numerous angular spores; 2, *tetraspores* attached to the pinnules, sessile or stalked, solitary or glomerulate, tripartite.—Ptilota (*Ag.*), from πτιλωτος, *pinnated.*

Frons compressa v. anceps, disticha, pectinato-pinnata, corticata, axi articulato monosiphonio percursa; pinnulis sæpius corticatis, nunc pellucide articulatis. Fruct.: 1, *favellæ involucratæ sporas numerosas angulutas foventes;* 2, *tetrasporæ ad pinnulas sessiles v. pedicellatæ, sparsæ v. glomerulatæ, triangule divisæ.*

Ptilota *Jeannerettii;* frond irregularly pinnato-decompound or subcorymboso-paniculate; rachis two-edged, plano-compressed; branches alternate or scattered, unequal, erecto-patent; pinnules corticate, pectinate, unequal, acute, the uppermost frequently pinnellate; favellæ with an involucre of articulated, monosiphonous ramelli; tetraspores corymboso-paniculate, terminating one-tubed, articulate ramelli.

P. Jeannerettii; *fronde vage pinnato-decomposita v. corymboso-paniculata; rachide ancipito plano-compresso; ramis alternis sparsisve inæqualibus erecto-patentibus; pinnulis corticatis pectinatis inæqualibus acutis, superioribus sæpe pinnellatis; favellis pedicellatis involucratis, involucri ramellis articulatis incurvis; tetrasporis ramellos corymboso-paniculatos monosiphonios articulatos terminantibus.*

Ptilota Jeannerettii, *Harv. in Fl. Tasm. v.* 2. *p.* 331; *Alg. Austr. Exsic. n.* 479.

Thamnocarpus Ptilota, *Hook. f. et Harv. in Lond. Jour. v.* 6. *p.* 409.

Carpothamnion? Ptilota, *Kütz. Sp. Alg. p.* 669.

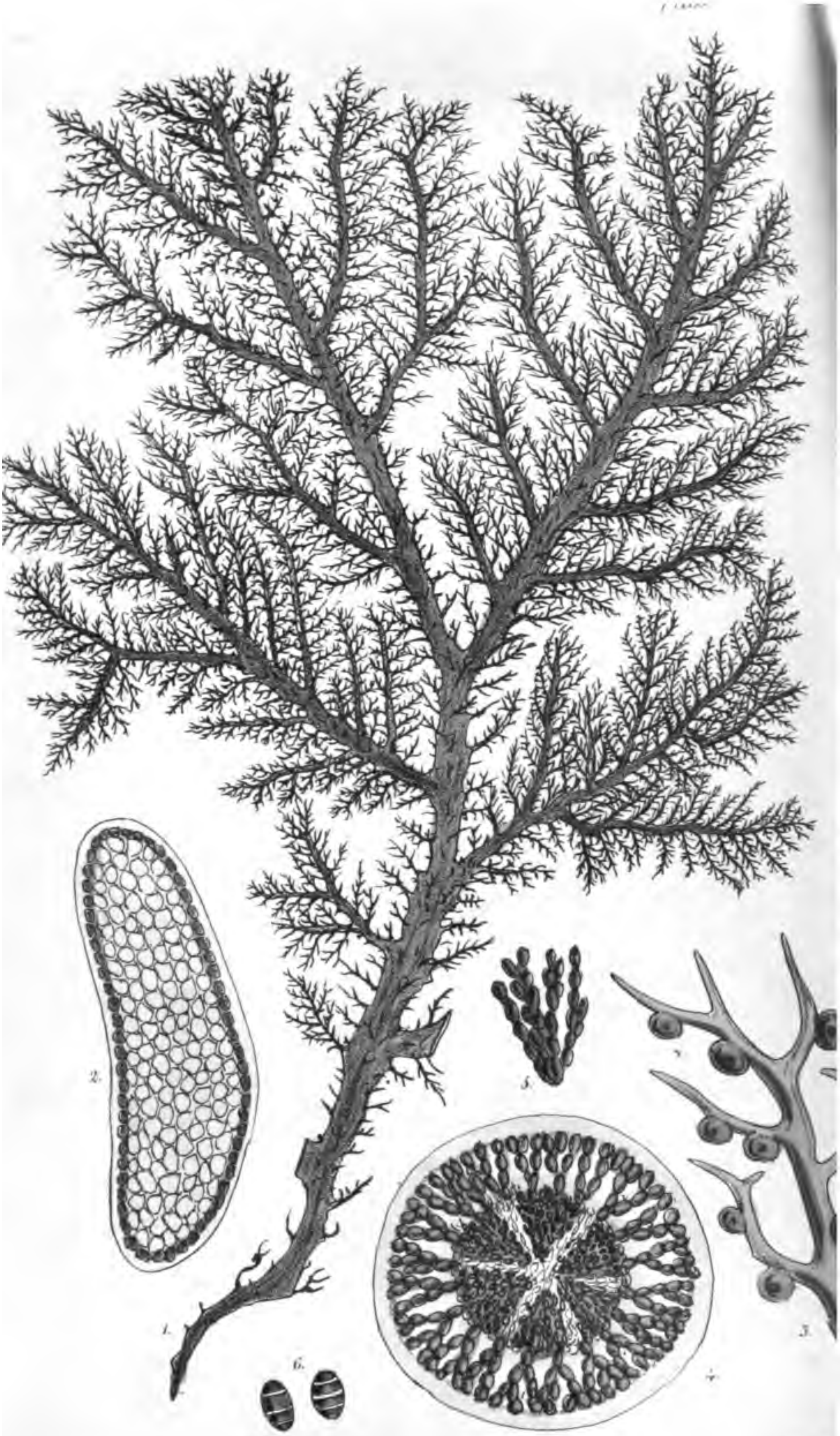
Hab. Port Arthur, Tasmania, *Dr. Jeannerett.* South Port, *Mr. C. Stuart.* South Australia, *Dr. Curdie.* Port Fairy and Port Phillip Heads, *W. H. H.*

Geogr. Distr. South coast of Australia. Tasmania.

Descr. *Root* a small disc. *Frond* a foot long and as much in the expansion of the branches; the stem and branches strongly compressed or flattened, a line or a line and a half in breadth. *Main branches* very irregularly inserted, alternate or scattered, few or many, simple or decompound. The *secondary branches* more regularly pinnate or bipinnate; but sometimes nearly bare and subsimple. *Penultimate branches* pectinated in their lower half with unequal, subulate, inarticulate ramuli; in the upper, often set with pectinate branchlets. *Colour* a dark vinous-red, becoming brighter after steeping in fresh-water. The *favellæ* are borne on minute, lateral pedicels, and occur solitary or in pairs, each surrounded by a circle of incurved, callithamnioid, simple involucral ramelli. *Tetraspores* are borne on minute, lateral, much branched, dichotomous, callithamnioid ramelli. The *substance* is coriaceo-cartilaginous and rather rigid, and the frond very imperfectly adheres to paper in drying; the full-grown does not adhere.

In general aspect and ramification this plant bears a close resemblance to *P. coralloidea*, but it is not only a perfectly distinct species, but if the internal structure of the stem were strictly attended to, it might even be referred to a different genus! In *P. coralloidea*, a cross cutting of the main rachis shows a very large axile tube, flanked on each side with two large lateral tubes, and surrounded by lax tissue, among which minor cavities are dispersed. In our *P. Jeannerettii*, on the contrary, there is a small axile *filament*, surrounded by a circle of interwoven longitudinal minute filaments, and through the rather dense cellular tissue that surrounds this centre are dispersed numerous cavities or tubes; a structure somewhat intermediate between that of *P. rhodocallis* and *P. striata;* and not *typically* different from the plant I have elsewhere figured under the name "*Pikea Californica*," a plant which future observation may show to be an anomalous *Ptilota*.

Fig. 1. PTILOTA JEANNERETTII,—*the natural size.* 2. Apex of a ramulus, with *favellæ.* 3. A *favella* and two of its involucral ramuli. 4. Apex with tufts bearing tetraspores. 5. Portion of one of the tufted ramelli, with tetraspores:—variously *magnified.*



Vend

PLATE CXCIX.

RHODOPHYLLIS? HYPNEOIDES, *Harv.*

GEN. CHAR. *Frond* flat, membranous, dichotomously or pinnately decompound, mostly margined with leafy or slender processes, and composed of two strata of cells; the medullary stratum formed of roundish-angular cells, the cortical of coloured cellules in one or few rows. *Fructification:* 1, marginal, external conceptacles, containing within a pericarp formed of radiating filaments, a compound nucleus, formed of bundles of spore-threads radiating from a basal (or central) placenta; 2, zonate *tetraspores*, immersed in the peripheric cells of the segments or marginal processes.—RHODOPHYLLIS (*Kütz.*), from ῥοδεος, *red*, and *φυλλον, a leaf.*

Frons plana, membranacea, dichotome v. pinnatim decomposita, segmentisque ciliisve marginalibus obsita, stratis duobus contexta; strato medullari cellulis rotundato-angulatis, corticali cellulis coloratis uni- v. pauci-seriatis composito. Fruct.: 1, *cystocarpia marginalia, externa, pericarpio filis moniliformibus radiantibus conflato munita, nucleum compositum ex fasciculis filorum radiantium formatum foventia; filis demum in sporas solutis;* 2, *tetrasporæ zonatim divisæ, fronde v. lacinulis marginalibus immersæ.*

RHODOPHYLLIS? *hypneoides;* frond broadly linear, subdistichously much branched, decompound pinnate; larger branches setigerous on the disc, closely bi-tripinnate, pinnæ and pinnulæ slender, patent, subulate, acute, sometimes thickened at the apex and hookpointed; cystocarps globose, inflated, sessile on the sides of the pinnules.

R. hypneoides; *fronde lato-lineari plana subdistiche ramosissima decomposite pinnata; ramis majoribus applanatis disco seticulosis crebre bi-tripinnatis; pinnis pinnulisque gracilibus patentibus subulatis acutis nunc apice incrassatis cirrhato-hamatis; cystocarpiis globosis inflatis ad latera pinnularum sessilibus.*

HYPNEA planicaulis, *Harv. Alg. Exsic. Austr. n.* 342; *Fl. Tasm. v.* 2. *p.* 315.

HAB. Western Port, Victoria, *W. H. H.* Georgetown, Tasmania, *W. H. H.*

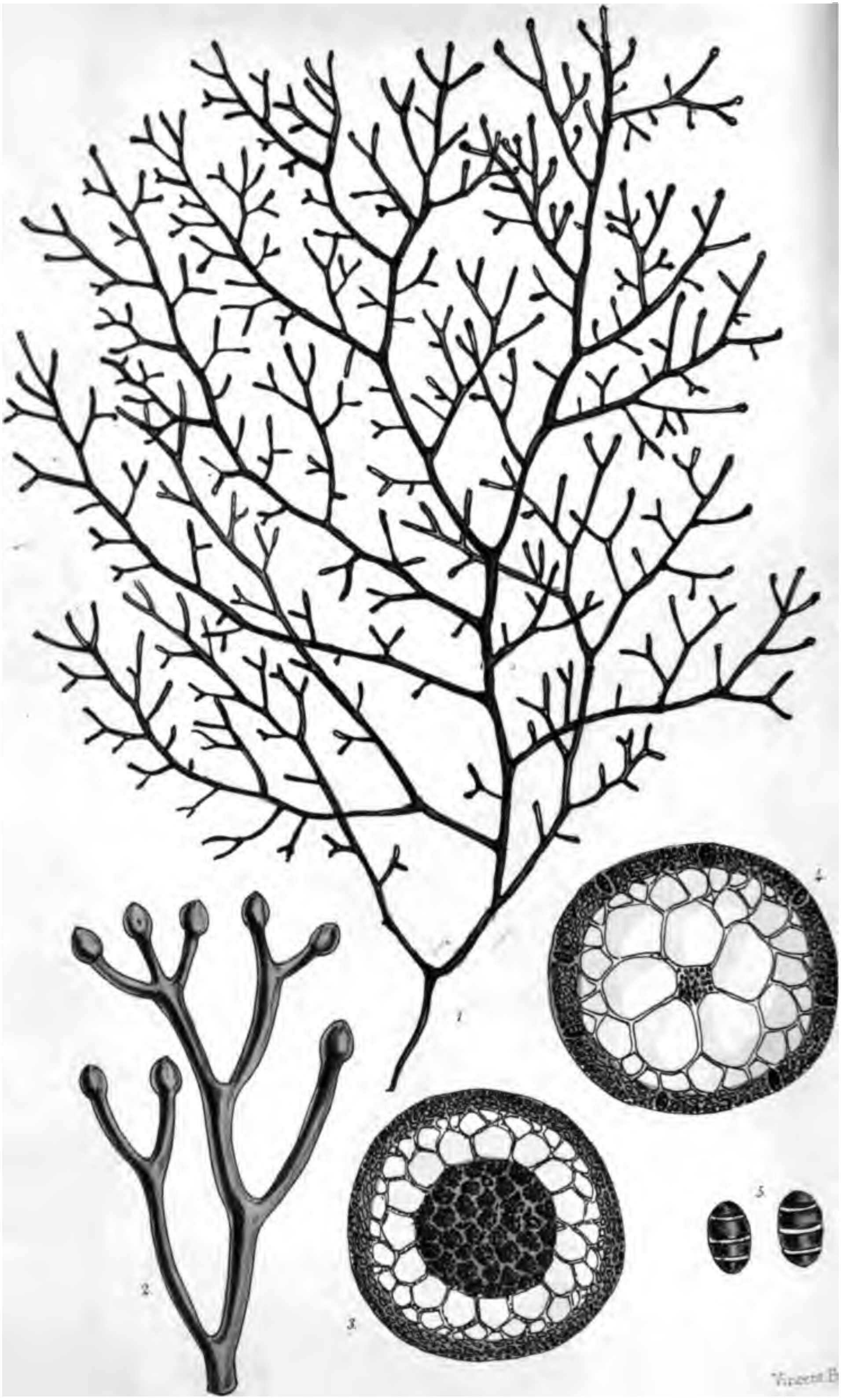
GEOGR. DISTR. South coasts of Australia. Tasmania.

DESCR. *Root* partly fibrous and clasping. *Frond* densely tufted, 6–8–12 inches long, 4–8 in the expansion of the branches, decompound pinnate, the main rachis 2–4 lines wide, those of the primary pinnæ 1–1½ line wide, all the lesser pinnules and their marginal processes very slender, filiform or capillary. The primary *pinnæ* are sometimes numerous, set at regular intervals of half to one inch, sometimes few and very irregularly placed, they are narrowed upwards and taper to a slender point: throughout their whole length they are closely set with slender pinnules, which are simple in the young parts and pinnate or subbipinnate in the older. The whole frond has a feathery appearance. The surface of the disc, in well-grown plants, is sprinkled with ciliary processes, more or less developed. Hooked tendril-like ramuli, like those so common in *Hypnea*, are frequently found in the lower part of the frond or of its segments. *Cystocarps* nearly spherical, on the marginal cilia; pericarps composed of dichotomous, moniliform, radiating filaments, rather widely separated by transparent gelatine, and with a wide pellucid coating of the same; spore-threads issuing in separate bundles from a central placenta. *Tetraspores* dispersed. *Colour* a full and rather deep red, preserved in drying. *Substance* soft and membranous. In drying the frond closely adheres to paper.

This handsome plant has so much more the aspect of a *Hypnea* than of a *Rhodophyllis* that I formerly unhesitatingly referred it to that genus, notwithstanding its flat frond. But a closer inspection and analysis of frond and fruit compel me to remove it from *Hypnea;* nor can I find any better place to put it than in *Rhodophyllis,* where it may stand next to the narrower varieties of *R. membranacea.* A clean cross-cutting of the cystocarp is a beautiful object under the microscope, owing to the size and brilliancy of the peripheric cells, and the clearness and abundance of the gelatinous matrix in which they are set.

Fig. 1. RHODOPHYLLIS HYPNEOIDES,—*the natural size.* 2. Transverse section of the frond. 3. Fertile ramulus, bearing conceptacles. 4. Transverse section through a conceptacle. 5. Tetraspores:—variously *magnified.*

Plate [illegible]



Vincent B

Ser. Rhodospermeæ. Fam. *Cryptonemiaceæ.*

Plate CC.

MYCHODEA TERMINALIS, *Harv.*

Gen. Char. ***Frond*** filiform, cartilaginous, alternately decompound, dendroid, composed of three strata; the ***medullary*** stratum of longitudinal and excurrent, interwoven and anastomosing filaments; the ***intermediate*** of large, roundish, empty cells, smaller outwards; the ***cortical*** of minute, coloured, vertically seriated cellules. ***Fructification:*** 1, external, lateral, or terminal ***conceptacles,*** containing, within a thick-walled pericarp, a compound ***nucleus,*** consisting of many confluent ***nucleoli,*** or masses of roundish-angular spores; 2, zonate ***tetraspores,*** dispersed in the branches and ramuli.—Mychodea (*Harv.*), from μυχος, ***an internal cavity,*** or secret chamber, alluding to the large empty cells of the intermediate stratum of the frond.

Frons filiformis, cartilaginea, alterne decomposita, dendroidea, stratis tribus contexta; strato medullari filis longitudinalibus et excurrentibus intertextis anastomosantibus, intermedio cellulis maximis rotundatis vacuis extus sensim minoribus, corticali cellulis minutis coloratis verticaliter seriatis composito. Fruct.: 1, ***favellidia intra pericarpium externum laterale v. terminale excepta;*** 2, ***tetrasporæ zonatim divisæ, sparsæ, frondi immersæ.***

Mychodea ***terminalis;*** frond terete fleshy-membranous, decompoundly much branched; branches patent, alternate and scattered, multifid or subdichotomous, divided, flexuous; axils rounded; ramuli subulate, simple or divided; cystocarps terminating the ramuli.

M. terminalis; ***fronde terete carnoso-membranacea decomposite ramosissima; ramis patentibus alternis sparsisve multifidis v. subdichotome divisis flexuosis; axillis rotundatis; ramulis subulatis simplicibus v. divisis; cystocarpiis ramulos (fere omnes) terminantibus.***

Mychodea terminalis, *Harv. Alg. Exsic. Austr. n.* 413; *Fl. Tasm. v.* 2. *p.* 323.

Hab. Georgetown, Tasmania, *R. Gunn, W. H. H.* Mouth of Snowy River, Victoria, *Dr. Mueller.*

Geogr. Distr. Tasmania. South coast of Australia.

Descr. *Roots* discoid. *Fronds* solitary, 12 inches long or more, and as much in the spread of the branches, terete, half a line to a line in diameter, very much branched and nearly of equal diameter in all parts. *Branches* alternately decompound, patent or divaricate, slightly narrowed at their insertion, unequal, slightly or much divided. *Ramuli* patent, subdistant, long or short, often very short, nearly horizontal in the cystocarpic, erecto-patent and acute in the tetrasporic individuals. *Cystocarps* oval, terminating almost every branch and ramulus of the specimens which bear them. *Tetraspores* zoned, dispersed through the peripheric cells; in more luxuriant individuals, with more copious ramuli and tapering, acute apices. *Colour* a very dull reddish-brown, or pale flesh-colour, becoming darker in drying. *Substance* coriaceous cartilaginous, tough but soft, bearing long immersion in fresh-water. In drying the frond closely adheres to paper.

This species, when not in fruit, can with difficulty be known, at least in the dried state, from slender specimens of *M. membranacea*, but when bearing cystocarps it is readily separable from that and from every other species by the *terminal* fruit. The tetraspore-bearing individuals are scarcely different from *M. membranacea*, and are probably often confounded with it. Their cellular structure however is not the same.

Fig. 1. MYCHODEA TERMINALIS, the cystocarp-bearing individual,—*the natural size*. 2. Apex of a fertile branch. 3. Transverse section through a cystocarp. 4. Transverse section of frond, with tetraspores imbedded in the cortical layer. 5. Tetraspores:—all *magnified*.

Plate [illegible]

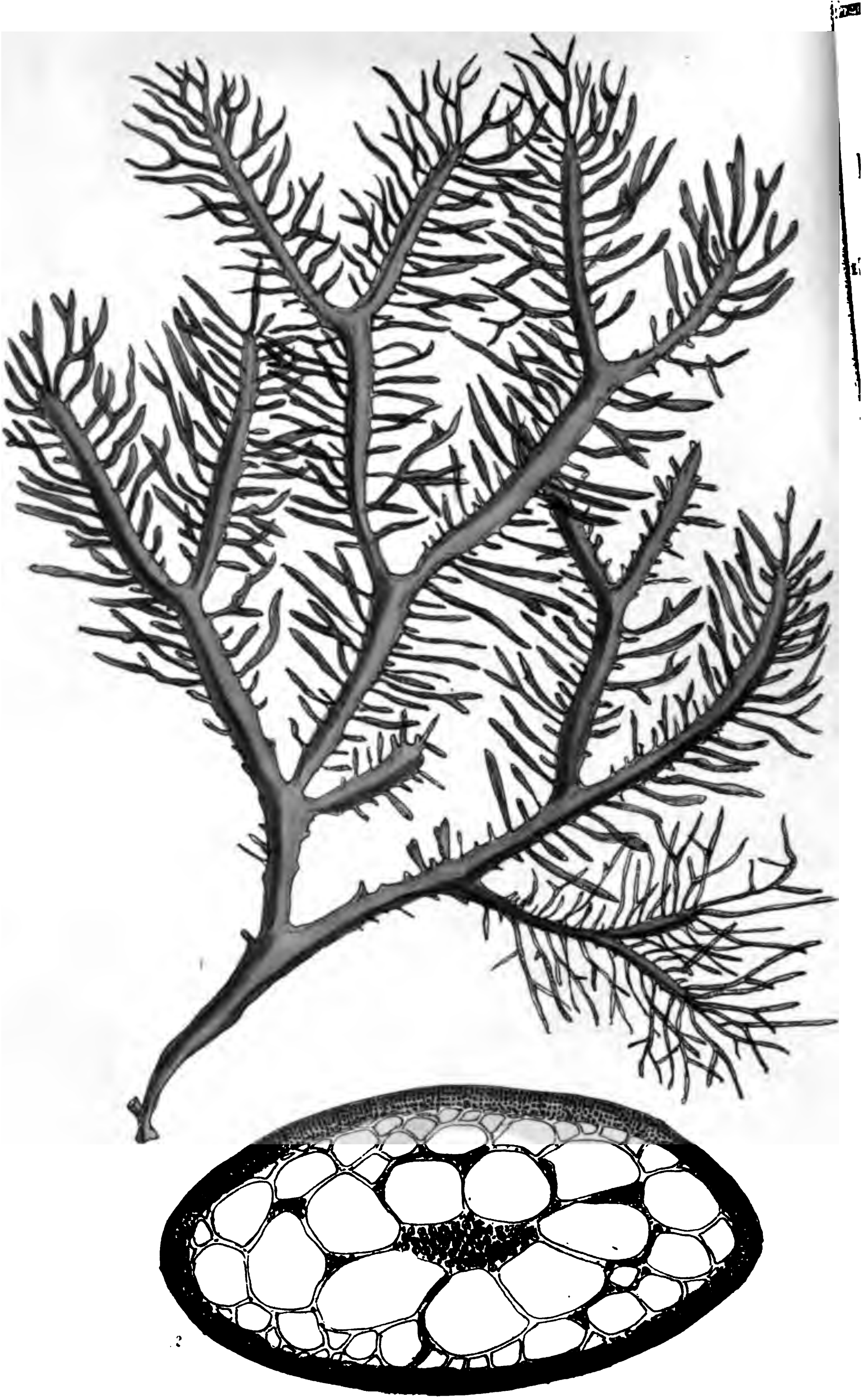


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PLATE CCI.

MYCHODEA COMPRESSA, *Harv.*

GEN. CHAR. *Frond* filiform, cartilaginous, alternately decompound, dendroid, composed of three strata; the *medullary* stratum of longitudinal and excurrent, interwoven and anastomosing filaments; the *intermediate* of large, roundish, empty cells, smaller outwards; the *cortical* of minute, coloured, vertically seriated cellules. *Fructification:* 1, external, lateral, or terminal *conceptacles,* containing, within a thick-walled pericarp, a compound *nucleus,* consisting of many confluent *nucleoli,* or masses of roundish-angular spores; 2, zonate *tetraspores,* dispersed in the branches and ramuli.—MYCHODEA (*Harv.*), from *μυχος, an internal cavity,* or secret chamber, alluding to the large empty cells of the intermediate stratum of the frond.

> *Frons filiformis, cartilaginea, alterne decomposita, dendroidea, stratis tribus contexta; strato medullari filis longitudinalibus et excurrentibus intertextis anastomosantibus, intermedio cellulis maximis rotundatis vacuis extus sensim minoribus, corticali cellulis minutis coloratis verticaliter seriatis composito. Fruct.:* 1, *favellidia intra pericarpium externum laterale v. terminale excepta;* 2, *tetrasporæ zonatim divisæ, sparsæ, frondi immersæ.*

MYCHODEA *compressa;* frond cartilaginous, robust, plano-compressed, irregularly dichotomous; laciniæ closely pinnated with slender, simple or pinnulate distichous ramuli; ceramidia minute, near the tips of the ramuli.

> M. compressa; *fronde cartilaginea robusta plano-compressa vage dichotoma; laciniis creberrime pinnatis; pinnulis distichis filiformibus simplicibus furcatisve nunc subpinnulatis; cystocarpiis minimis sub apicibus ramulorum semi-immersis.*

MYCHODEA compressa, *Harv. Alg. Austr. Exsic. n.* 414.

HAB. Phillip Island, Western Port, *W. H. H.*

GEOGR. DISTR. Victoria.

DESCR. *Root* discoid. *Frond* 8–16 inches to two feet high, forked or alternately divided, or repeatedly but irregularly dichotomous, compressed, the wider portions almost flattened, 1–4 lines wide, everywhere closely pinnated with slender, distichous ramuli, which issue from the sharper edge of the branch. *Ramuli* 1–1½ inch long, slender, subcompressed, the lesser ones nearly terete, slightly constricted at base, acute, either quite simple or forked, naked or having a few lateral, distant pinnules, widely spreading or horizontal. *Conceptacles* minute, nearly immersed toward but below the ends of the pinnules. *Colour* a dull red, sometimes pale, and almost horn-colour, sometimes dark and verging to brown. *Substance*, when recent, firmly cartilaginous, but succulent, softening in the air. In drying the young frond adheres firmly to paper, the older not so firmly. Every part shrinks considerably.

This is the most robust species of *Mychodea*, and differs in habit from all the genus, except *M. disticha* (figured in Fl. Tasm.). In primary ramification, in colour, and in the abundance of lateral ramuli, it nearly resembles *Nemastoma? comosa* (Tab. CIX.), a native of the same part of the coast; but in internal structure and fructification these plants are extremely unlike.

Though the frond is compressed, it is not nearly so much *flattened* and *two-edged* as in *M. disticha;* the substance is softer and structure looser, and the ramuli are much longer, more slender, less flattened, and not so strongly constricted at the base. Though the differences are not readily expressible in words, the plants look very different, as may be seen by comparing the figure now given with Fl. Tasm. t. 192 *A*.

Fig. 1. MYCHODEA COMPRESSA,—*the natural size*. 2. Cross section through one of the ramuli,—*magnified*.

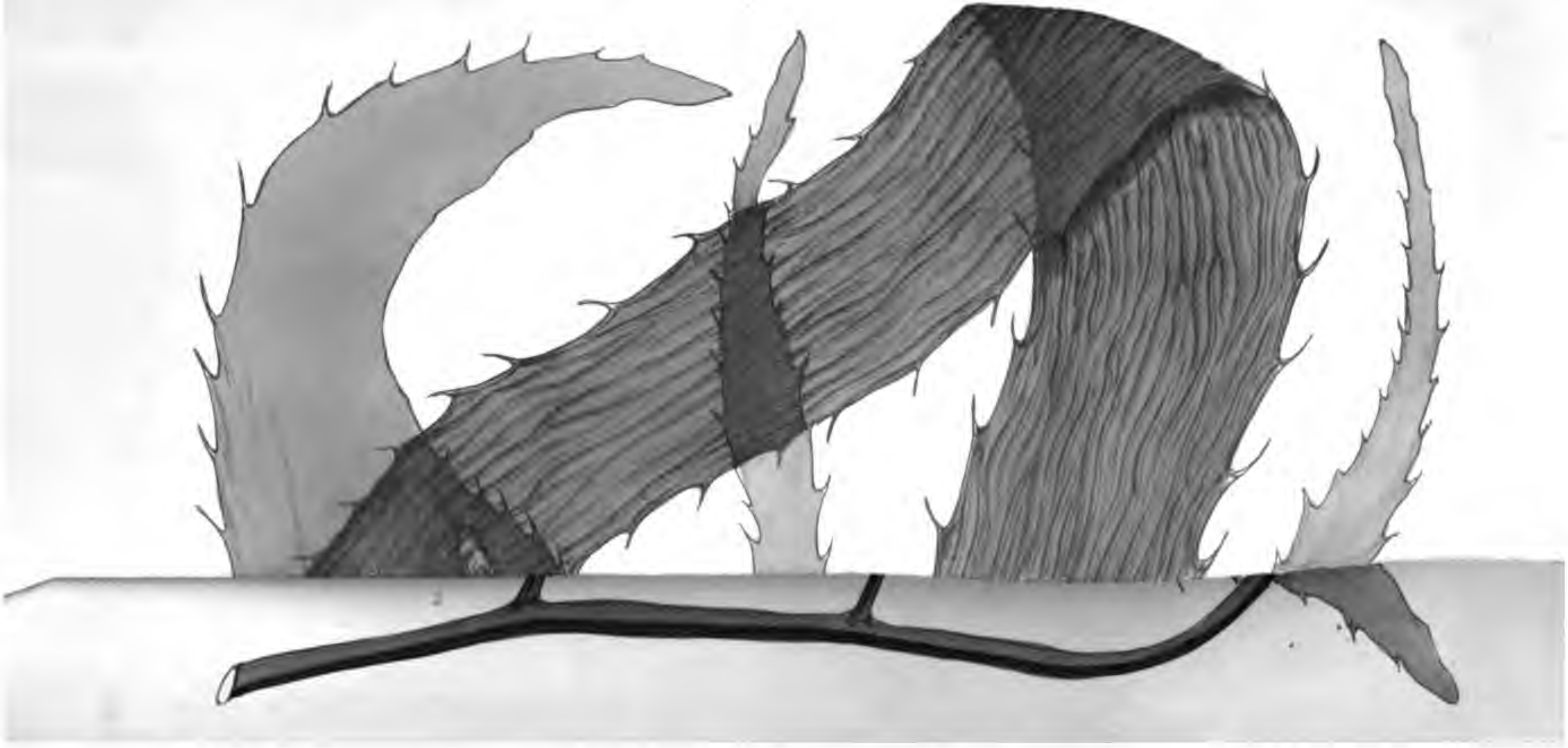


PLATE CCII.

MACROCYSTIS PYRIFERA, *Ag.*;

Var. DUBENII, *Aresch.*

T. CHAR. *Root* branching. *Stem* filiform. *Leaves* simple, formed by the continual splitting of a primary terminal leaf, developed in secund order along the lengthening stem, petiolate, having an *air-vessel* in the petiole. *Spores* forming irregular, superficial, cloud-like patches on small radical leaves, ellipsoidal, with hyaline perispore, surrounded by densely packed, inarticulate, clavate paranemata.—MACROCYSTIS (*Ag.*), from *μακρος*, *large*, and *κυστις*, *a vesicle.*

Radix ramosa. Caulis filiformis. Folia simplicia, fissura adscendenti folii terminalis orta, in caule elongato secunda, basi vesiculifera; radicalia evesiculosa, petiolis dichotomis. Sporæ soros nebulosos in foliis radicalibus superficiales formantes, ellipsoideæ, perisporio hyalino, paranematibus inarticulatis clavatis circumdatæ.

ACROCYSTIS *pyrifera*, var. *Dubenii*; stem filiform; vesicle cylindrical-clavate, 4–5 times as long as broad; leaf linear-lanceolate, undulate-furrowed.

M. pyrifera, *var.* Dubenii; *caule filiformi; vesicula cylindraceo-clavata diametro 4–5-plo longiore; folio lineari-lanceolato undulato-sulcato.*

MACROCYSTIS Dubenii, *Aresch. Icon. Phyc. p.* 5. *t.* 10.

AB. Outside Port Phillip Heads, abundantly. (Other varieties found on the south coast of Australia, to the east of Cape Northumberland, and in Tasmania.)

EOGR. DISTR. *Macrocystis pyrifera*, in one or other of its forms, is found extensively throughout the Southern Ocean, south of the tropic, and along the whole west side of America as far north as Unalaschka and Sitcha. Indian Ocean, *Sundevall, fide J. Agardh.* Not found in the Atlantic?

ESCR. (Var. *Dubenii.*) *Root* extensively branching, throwing up many stems. *Stems* filiform, 50–100 feet long or more, 2 lines in diameter, producing leaves in secund order at distances of from 2–12 inches apart, according to the portion of the stem examined. *Terminal leaf* narrow, ensiform, hooked inwards at the point, obliquely ovate at base, and there splitting, bordered with long, slender ciliary processes. Lateral *leaves* 2–4 feet long, 2–3 inches in breadth, corrugated longitudinally into parallel ridges and furrows, which are more apparent on the dried specimen, tapering to both ends, and bordered with slender cilia, ½–1 inch apart. *Vesicles*, when young, almost fusiform, 2–2½ inches long, afterwards becoming clavate, and then cylindrical, and eventually 4–5 inches or more in length. *Substance* of the young leaves membranous, of the old coriaceous. In drying it does not adhere to paper.

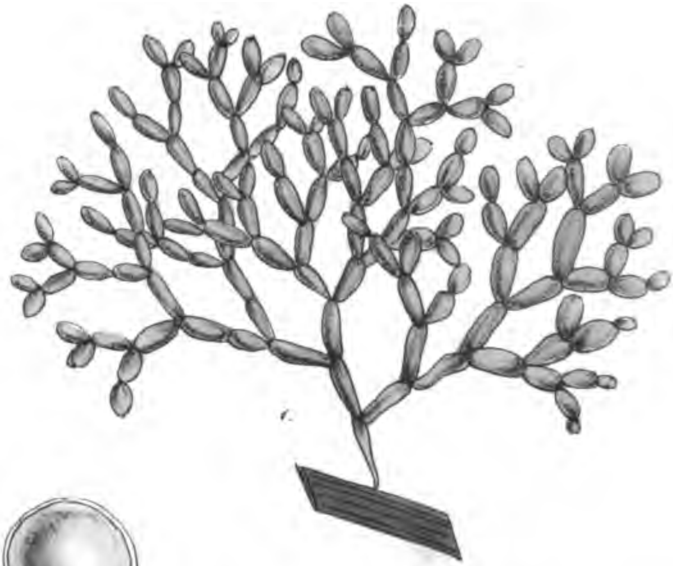
* * *

We here figure one of the many varieties of the great "*Kelp*" of the Southern and Pacific Oceans, said to be the *longest* (though not the *largest*) vegetable in the world. The cord-like stems, when the plant grows in deep water, have been estimated variously at 500 and at 1,500 feet. A middle number would probably be no exaggeration; though off the Australian coast no such length has been ascertained. At whatever depth the plants vegetate the stem rises, at a considerable divergence from the perpendicular, to the surface, where its leaves are buoyed up by their vesicles, and it often stretches along the waves for many fathoms horizontally.

The mode of development of the new leaves—by a splitting in the base of the terminal leaf—is better shown by our Fig. 2 than can be explained by description. It is only the terminal leaf, which must be regarded as a modification of a "bud," which developes new leaves; the lateral leaves, once formed, remain unchanged till they decay.

I still adhere to the opinion, expressed many years ago, that the various forms of *Macrocystis*, which many authors regard as "species," are merely varieties, dependent on local circumstances, or on age, etc.

Fig. 1. Apex of a stem of *Macrocystis*, showing the terminal primary leaf, out of which the lateral leaves are successively formed by continual vertically ascending splitting of the base. 2. Portion of the older stem, with adult leaf and vesicles:—both figures *the natural size.*



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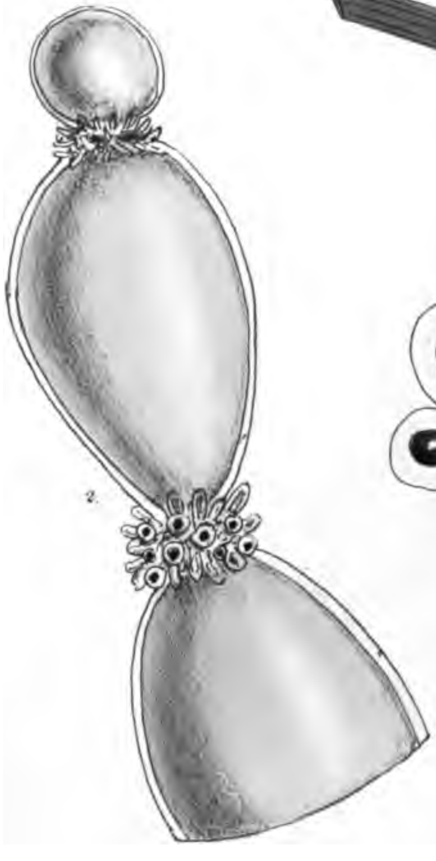

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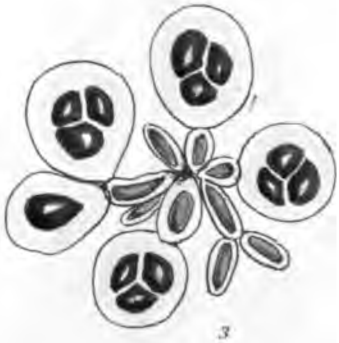

3.

Vincent Brooks Imp.

PLATE CCIII.

GRIFFITHSIA OVALIS, *Harv.*

EN. CHAR. *Frond* filiform, dichotomous, articulated, monosiphonous, naked. *Fructification:* 1, involucrate *favellæ,* containing numerous angular spores; 2, *tetraspores* attached to the inner faces of involucral ramelli, globose, triangularly parted.—GRIFFITHSIA (*Ag.*), in honour of the late Mrs. Griffiths, of Torquay, Devonshire.

Frons filiformis, dichotoma, articulata, monosiphonia, ecorticata. Fruct.: 1, *favellæ involucratæ sporas numerosas angulatas foventes;* 2, *tetrasporæ triangule divisæ interiore latere involucri, ramellis pluribus constituti seriatæ.*

RIFFITHSIA *ovalis;* frond erect (1–2 inches high), di-trichotomous, subfastigiate, very robust; branches erecto-patent; articulations 3–4 times longer than the diameter, the lower clavate, the middle and upper obovate, inflated, much constricted at the ends; fertile articulations similar; involucres of tetraspores composed of very minute ramelli, whorled round the dissepiments.

G. ovalis; *fronde erecta (sub-biunciali) di-trichotoma subfastigiata crassissima; ramis erecto-patentibus; articulis diametro 3–4-plo longioribus, inferioribus clavatis, mediis superioribusque obovatis inflatis ad genicula maxime constrictis, fertilibus conformibus; involucris tetrasporarum circa genicula verticillatis e ramellis minimis conflatis.*

GRIFFITHSIA ovalis, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 559.

AB. On *Zostera,* at King George's Sound, *W. H. H.*

EOGR. DISTR. Western Australia.

ESCR. *Root* discoid. *Fronds* subsolitary, scattered, 1–2 inches high, flabelliform, subfastigiate, dichotomously or subtrichotomously branched, the branches erecto-patent, the upper ones pretty regularly dichotomous. *Articulations* 3–4 times as long as broad, the larger ones 1½ lines in diameter, inflated, very much constricted at the nodes; the lower ones club-shaped or pyriform, the middle obovate or oblong, the upper more exactly oval, the terminal at first globose, then oval. *Involucres* whorled round the upper nodes, not on separate ramuli; involucral ramelli very minute, of few cells, bearing large tetraspores at their tips. *Tetraspores* globose, with wide borders. *Colour* a very pale red, fading to horn-colour. The membrane (or cell-wall) of the articulations is very thin, and not so gelatinous as in most species of *Griffithsia.* The *substance* is soft, and the frond, in drying, closely adheres to paper.

Except for the much greater diameter of the cells composing the filaments of the frond, this species does not materially differ from *C. corallina,* which is found also on the Australian coast, and which in Tasmania attains a great size. Some allowance may be made for circumstances of growth, and if the size of the whole plant had borne a comparison to the size of each component "articulation" or cell, I should probably have regarded this present Alga as merely a robust form of *G. corallina;* but here we have a peculiarly small or short-growing plant, with constantly much larger cells than are found, except very incidentally, in the most luxuriant states of *G. corallina.* Besides this, the cell-wall in the present plant is much thinner and less gelatinous than in *G. corallina* and most others of the genus.

Fig. 1. GRIFFITHSIA OVALIS,—*the natural size.* 2. Apex of a fertile branch, with two involucres, *in situ.* 3. Ramelli and tetraspores from an involucre: —*magnified.*

Plate [illegible]

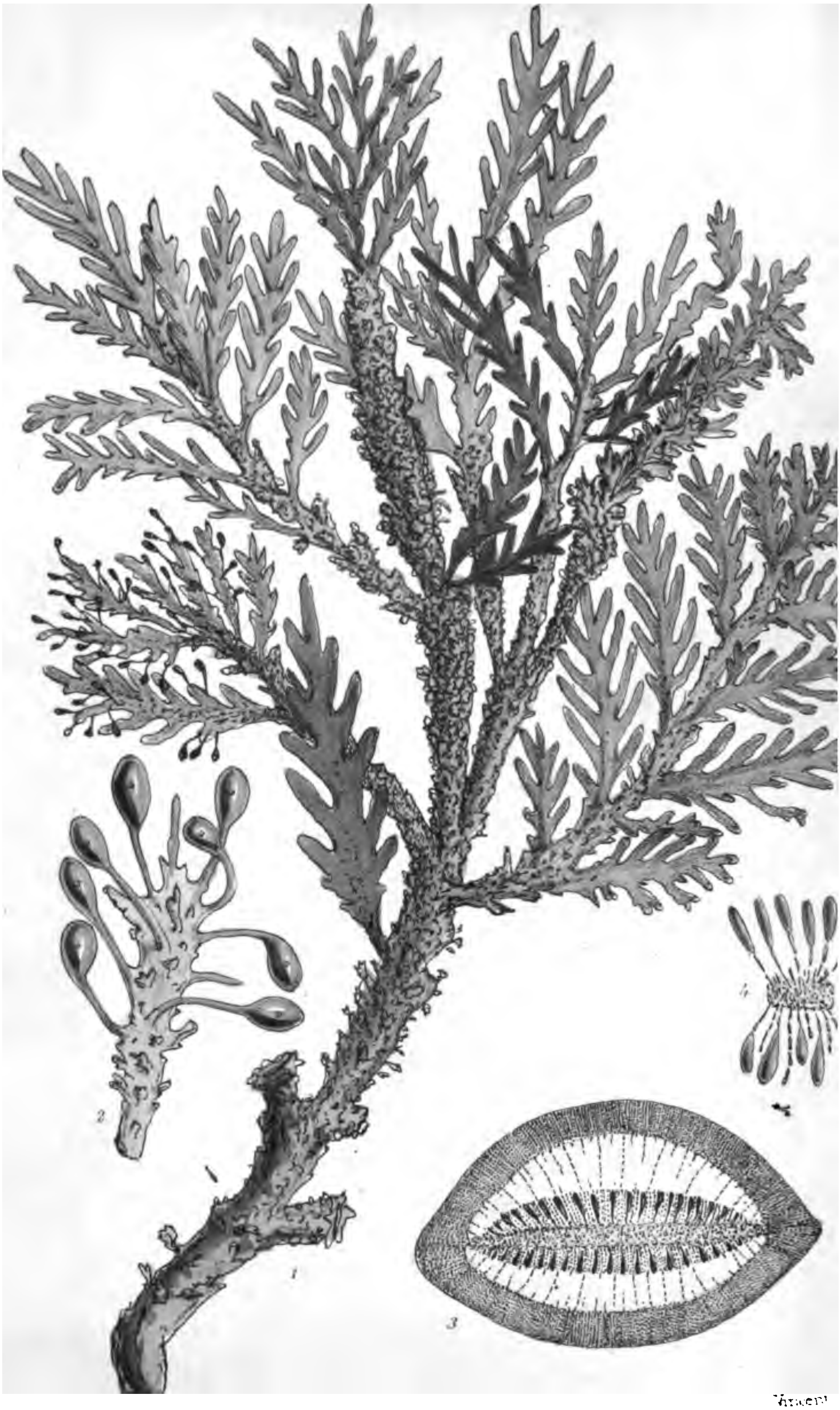

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PLATE CCIV.

GELIDIUM PROLIFERUM, *Harv.*

GEN. CHAR. *Frond* firmly cartilaginous, linear, compressed, decompound-pinnate, composed of three strata; the *medullary* stratum of densely packed, interwoven, longitudinal filaments; the *intermediate* of polygonal cells; the *cortical* of minute, coloured cellules, arranged in horizontal, moniliform series. *Fructification:* 1, bilocular *conceptacles* immersed in the ramuli, containing, within a thick pericarp, pedicellate, pear-shaped spores, dispersed over both surfaces of a medial dissepiment, which is united to the pericarp by slender filaments; 2, cruciate *tetraspores,* forming sori in dilated ramuli. — GELIDIUM (*Lam.*), from *gelu,* frost, whence also *gelatine;* but none of the species are gelatinous.

Frons corneo-cartilaginea, linearis, anceps, pinnatim decomposita, tribus stratis cellularum contexta; medullari ex filis tenuibus intertextis longitudinalibus, intermedio ex cellulis polygonis, corticali ex cellulis minutis coloratis in fila horizontalia brevissima seriatis composito. Fruct.: 1, *cystocarpia bilocularia in ramulis immersa, ad dissepimentum longitudinale filis tenuibus cum pericarpio crasso junctum, sporas subpyriformes sparsas pedicellatas foventia.*

GELIDIUM *proliferum;* frond semiterete and very robust below, plano-compressed or flattened upwards, decompoundly pinnate and proliferous, densely muricated with minute bristle-like points, which afterwards become leafy; pinnæ and pinnules broadly linear, flat; pinnules erecto-patent, subopposite; cystocarps terminating slender, filiform, or flattened, simple or pinnulated processes of the pinnules.

G. proliferum; *fronde inferne semitereti crassissima, superne compresso-plana v. applanata decomposite pinnata et prolifera, setis minutis demum foliaceis densissime muricata; pinnis pinnulisque lato-linearibus planis, pinnulis erecto-patentibus suboppositis; cystocarpiis processus filiformes simplices v. pinnatos e pinnulis emissos terminantibus.*

GELIDIUM proliferum, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 551. *Harv. Alg. Exsic. Austr. n.* 336.

HAB. Cast ashore, after storms, at Fremantle, Western Australia, *Mylne, Backhouse, W. H. H.*

GEOGR. DISTR. West coast of Australia.

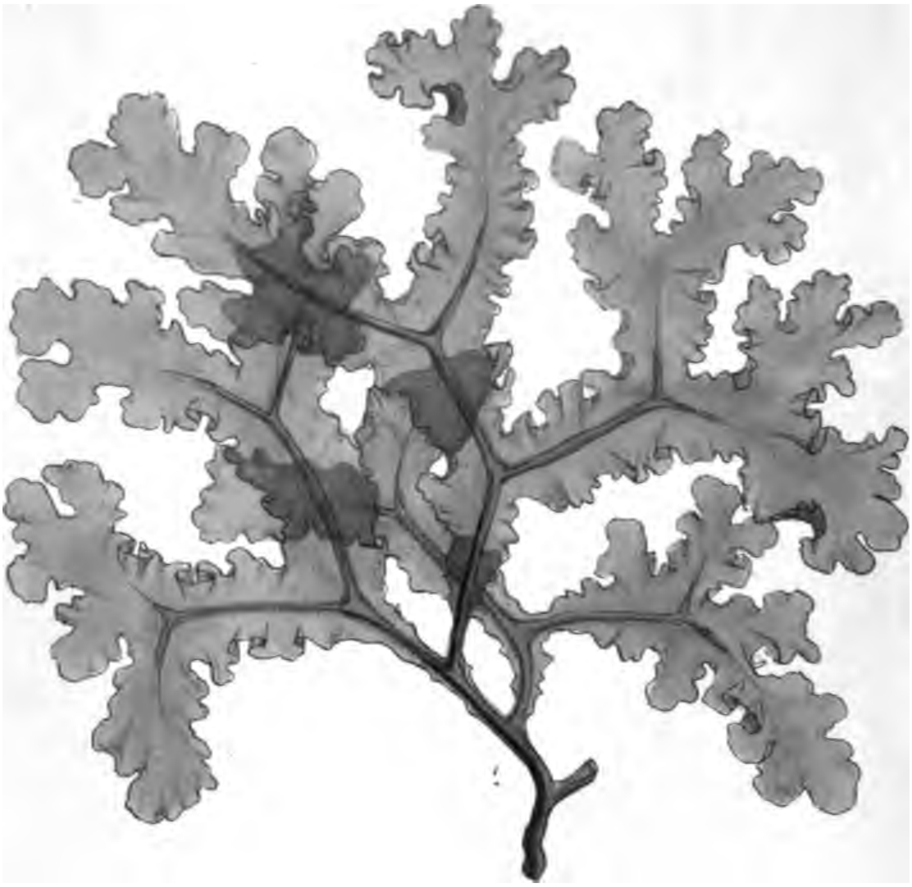
DESCR. *Root* branching. *Frond* 12–18 inches long, very robust; the main stem nearly cylindrical at base, and often $\frac{1}{4}$–$\frac{1}{3}$ inch in diameter, very hard and horny, becoming compressed upwards and almost quite flat above, irregularly divided on a subpinnate type, the lesser branches pretty regularly bipinnate or occasionally subtripinnate. The main stem and branches and the rachides of the larger pinnæ are densely covered with minute processes, which begin as bristle-shaped hard points, then grow flat, and expand into minute, crowded or imbricating leaflets, 1–2 lines long, and very irregular in shape; these are rarely absent, and usually are very abundant. Occasionally pinnated branchlets spring irregularly from the flat side of the stem. The ordinary *pinnæ* are 1–2 inches long, oblong, flat, closely and regularly pinnulate; the *pinnules* broadly linear and blunt. *Cystocarps* on slender, elongated processes of the pinnæ, oval, bilocular, with a thickish central placenta, bearing pear-shaped spores mixed with paranemata. *Colour* a dark red, passing through various shades of red and orange to horn-colour on exposure. *Substance* very hard and horny. In drying the frond does not adhere to paper.

* * *

Whatever may be said of some other species of *Gelidium*, I suppose it will not be questioned that the present is a very distinct and remarkable species. In its leafy pinnæ it is, in habit, almost intermediate between *Gelidium* and *Suhria*, but the absence of nerve retains it in *Gelidium;* the same expanded pinnæ remind us of *Pterocladia lucida*, but the two-celled conceptacle shuts it off from affinity with that Alga. Old fronds, which are very thick, and completely clothed with minute proliferous leaflets, and often destitute of true pinnæ, have much the aspect of some *Thamnoclonium.* And here our resemblances are exhausted. It is curious that we should find the "*representatives*" of a species, not in the genus, to which by exact characters of fruit it so clearly belongs, but in other genera unequally near in general affinity. If genera "diverge" one from another, we may *guess* that, supposing *Gelidium* to be the older type of structure, from some species like the present, both *Suhria*, *Pterocladia*, and perhaps *Thamnoclonium* may have sprung. Who can contradict us, if we do?

Fig. 1. GELIDIUM PROLIFERUM,—*the natural size.* 2. Apex of a fertile pinnule, with *cystocarps* terminating the processes. 3. Cross section of a cystocarp; small portion of the placenta, with spores, *in situ:—magnified.*

Plate CI



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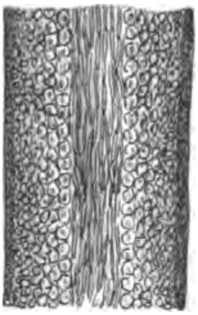
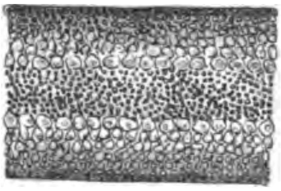




3

Vincent Brooks Im.

PLATE CCV.

CRYPTONEMIA UNDULATA, *Sond.*

GEN. CHAR. *Frond* flat, rigid, caulescent, proliferous and branched, formed of three strata; the *medullary* stratum of longitudinal, slender, closely interwoven filaments; the *intermediate* of roundish cells; the cortical of minute cellules. *Fructification:* 1, simple *favellæ*, immersed in the substance of the frond; 2, cruciate *tetraspores*, collected in roundish sori, either under the apices, or in special fruit-leaves.—CRYPTONEMIA (*J. Ag.*), from *κρυπτω, to hide*, and *νημα, a thread;* alluding to the hidden threads of the medullary stratum.

Frons plana, chartacea, caulescens, prolifera et ramosa, stratis fere tribus contexta; strato medullari filis elongatis longitudinalibus tenuibus dense intertextis, intermedio cellulis rotundatis majusculis, corticali cellulis minimis constante. Fruct.: 1, *favellæ simplices, in frondem immersæ;* 2, *tetrasporæ cruciatim divisæ, in soros rotundatos collectæ, soris infra apices aut in sporophyllis propriis positis.*

CRYPTONEMIA *undulata;* caulescent; stem dichotomous, winged above, and passing into basally midribbed, broadly linear, forked, curled and bluntly lobulate or subpinnatifid laminæ; axils very open, apices blunt.

C. undulata; *caulescens, caule dichotomo superne alato et in laminas inferne costatas lato-lineares furcatas crispatas et hic illic obtuse lobulatas v. subpinnatifidas abeunte, axillis omnibus latissimis apicibusque obtusis.*

CRYPTONEMIA undulata, *Sond. in Linn. v.* 26. *p.* 516.

CRYPTONEMIA luxurians, *Harv. Alg. Exsic. Austr. n.* 402 (*non J. Ag.*).

HAB. Brighton beach, Port Phillip, *Dr. Mueller, W. H. H.* South Australia, *Dr. Curdie.*

GEOGR. DISTR. South coast of Australia.

DESCR. *Root* discoid. *Fronds* tufted, 4–5 inches long, and as much or twice as much in the expansion of the subdivisions. *Stem* filiform, very rigid, naked below, then winged, forking once or twice, and each division passing into the midrib of a terminal twice or thrice forked *lamina:* the midrib growing fainter upwards and disappearing long below the apex. The *laminæ* are ½–¾ inch wide, very much curled, with an undulating margin, and not rarely laterally sinuated into very blunt lobes, sometimes one or two such lobes on a segment, sometimes several, and then alternate. The forkings of the stem and midrib are very wide, often at an obtuse angle, and sometimes greatly divaricated. All the apices are very blunt. No fruit has been seen. The *colour* when recent is a somewhat pinky brightish red, fading on exposure to dirty-white. The *substance* when fresh is like that of parchment; when dry, very tough and rigid. The plant does not in the least adhere to paper in drying.

* * *

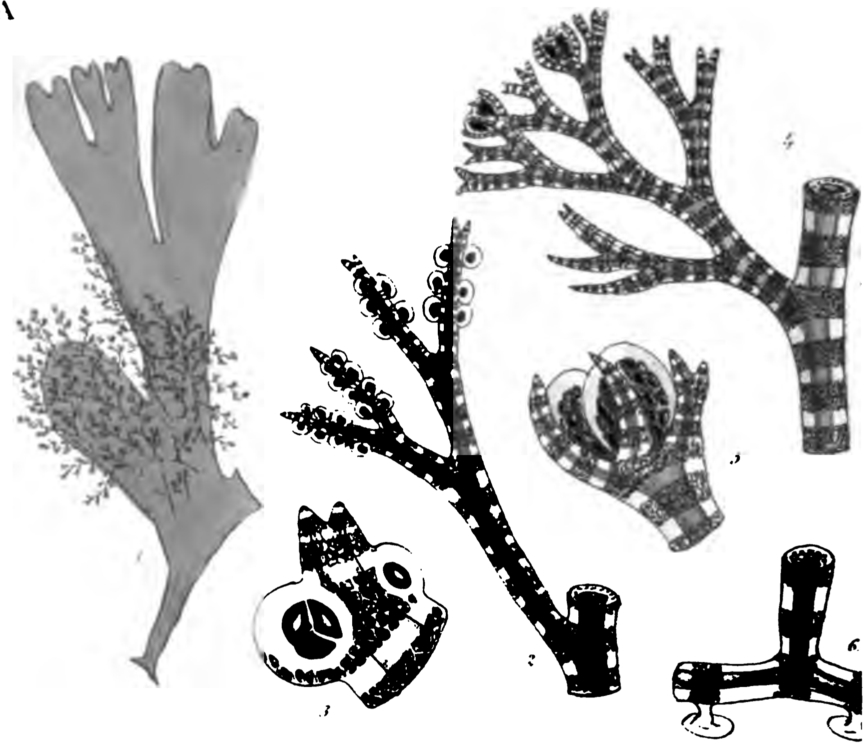
Of this I have received specimens from Dr. Curdie and Dr. Mueller, and have myself collected it in abundance on Brighton beach, where, after storms, it is frequently thrown up in large quantities. None of my specimens, however, bear fruit, and those described by Sonder are equally barren.

In distributing my Australian Algæ formerly, I erroneously referred this plant to the *C. luxurians*, Ag., a species unknown to me except by description, but which, from description, seems at least to be a nearly allied form.

Fig. 1. CRYPTONEMIA CRISPA,—*the natural size.* 2. Longitudinal section of the lamina. 3. Transverse section:—*magnified.*

Plate

A



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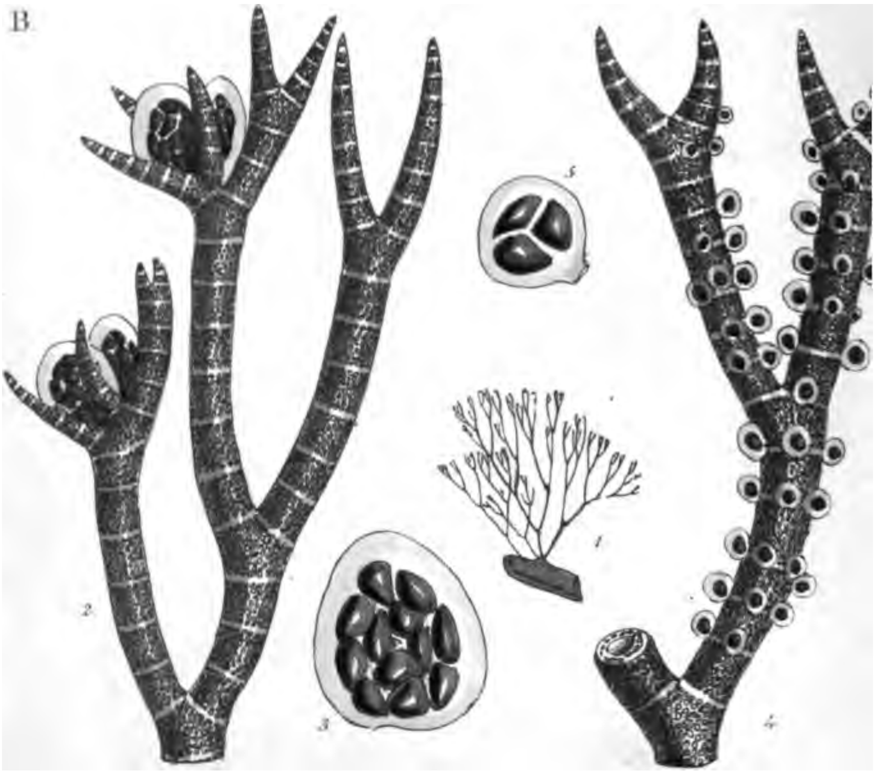


PLATE CCVI. A.

CERAMIUM MINIATUM, *Suhr.*

GEN. CHAR. *Frond* filiform, dichotomous or subpinnate, articulate; the articulations partly or wholly coated with small, irregularly placed (not seriated), coloured, polygonal cellules. *Fructification:* 1, sessile *favellæ*, subtended by 2–4 involucral ramuli; 2, triangularly divided *tetraspores*, formed of some of the cortical cellules, more or less projecting from the surface.—CERAMIUM (*Lyngb.*), from *κεραμιον, a pitcher;* because the fruit is *not* pitcher-shaped.

Frons filiformis, dichotoma aut pinnatim ramosa, articulata; articulis plus minus cellulis minutis polyhedris coloratis vagis (nec seriatis) corticata. Fruct.: 1, *favellæ sessiles, ramulis* 2–4 *involucratæ;* 2, *tetrasporæ morphosi cellularum corticalium formatæ, plus minus extra stratum corticale prominentes, triangule divisæ.*

CERAMIUM *miniatum;* a primary creeping filament throws up minute, scattered, erect fronds; fronds compressed, distichously sub-bipinnate; pinnæ dichotomo-fastigiate, the terminal segments very short, tooth-like; articulations shorter than their diameter, rosy, all but the ultimate ones with naked interspaces; tetraspores prominent, seriated along the margin of the segments at each side.

C. miniatum; *filo primario repente frondes minutas (semiunciales) sparsas erectas emittente; fronde compressa disticha sub-bipinnata, pinnis dichotomo-fastigiatis; segmentis terminalibus brevissimis dentiformibus; articulis diametro brevioribus medio roseis, omnibus nisi supremis interstitiis nudis; tetrasporis secus marginem segmentorum utrinque longitudinaliter seriatis.*

CERAMIUM miniatum, *Suhr. J. Ag. Sp. Alg. v.* 2. *p.* 135. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 557. *Harv. Alg. Austr. Exsic. n.* 466.

HAB. Parasitic on *Melanosperms.* Fremantle, *G. Clifton.* On *Dictyota Kunthii,* at Rottnest Island, W. Australia. On *Ecklonia radiata,* at Kiama, N. S. Wales, *W. H. H.*

GEOGR. DISTR. Coast of Peru, *Suhr.* West and east coasts of Australia.

DESCR. Primary filaments prostrate on the surface of other Algæ, subsimple, creeping by means of small discs, and throwing up numerous, scattered, erect fronds. *Fronds* about ½–¾ inch long, oblong, with a slightly flexuous rachis, distichously sub-bipinnate. *Pinnæ* alternate, more or less compound, the upper ones dichotomous, the lower flabelliform, all fastigiate. *Articulations* coated with cellules round the joints, pellucid in the middle, each with a longitudinal sacculus or bag of endochrome; joints of the ramuli very short, with a narrow band. *Apices* slightly hooked inwards. *Favellæ* in pairs, oval, subterminal, subtended by 3-4 short ramuli. *Tetraspores* very prominent, globose, arranged along opposite margins of the ramuli, in longitudinal rows. *Colour* a bright purple. *Substance* soft, but not gelatinous. In drying, the frond adheres to paper.

A minute species, with a pinnated habit, not unlike a miniature Fern, and sufficiently marked by the creeping primary threads, the coloured sacculus of the joints, and the position of the tetraspores. I have not seen an authentic specimen of Suhr's plant, to which I venture to refer.

A. Fig. 1. CERAMIUM MINIATUM, growing on a young frond of *Dictyota Kunthii*, —*the natural size*. 2. Pinna, with tetraspores. 3. Apex of one of the divisions of the same. 4. Pinna, with favellæ. 5. Apex of a division, with its terminal *involucre* containing favellæ. 6. Part of the creeping primary filament :—*magnified*.

PLATE CCVI. B.

CERAMIUM ISOGONUM, *Harv.*

CERAMIUM *isogonum* ; frond minute (1–2 inches high), subsetaceous, dichotomous, fastigiate; segments erecto-patent, the terminal forcipate ; articulations corticated, all of equal length and breadth, marked with a hyaline medial line, but little constricted ; favellæ subterminal, bilobed, subtended by 1–2 ramuli; tetraspores prominent, whorled round the branchlets.

C. isogonum ; *fronde pusilla* (1–2-*unciali*) *subsetacea dichotoma fastigiata ; segmentis erecto-patentibus, terminalibus forcipatis ; articulis corticatis omnibus diametro æqualibus linea hyalina centrali notatis medio parumque constrictis ; favellis subterminalibus bilobis ramellis* 1–2 *fulcratis ; tetrasporis prominentibus singula serie circa genicula verticillatis.*

CERAMIUM isogonum, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 55. *Harv. Alg. Austr. Exsic. n.* 473.

HAB. On Algæ, at Garden Island, *W. H. H.*, *C. Clifton.* Port Fairy, *W. H. H.*

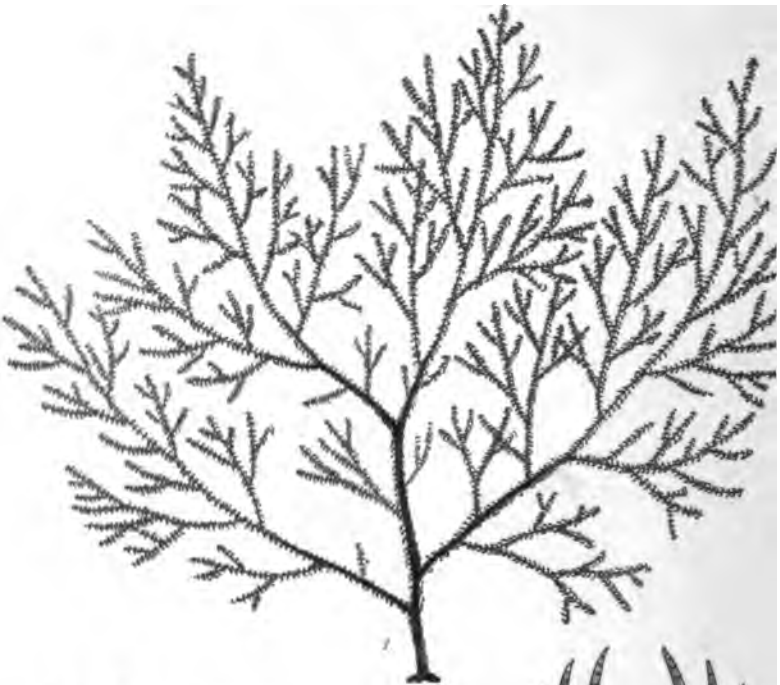
GEOGR. DISTR. Western and southern coasts of Australia.

DESCR. *Root* a small disc. *Frond* 1–2 inches high, distantly dichotomous, fastigiate, flabelliform, with strongly hooked apices. *Articulations* of nearly equal length and breadth in all parts of the frond, equally coated with coloured granules except on a narrow, medial, pellucid line. *Favellæ* ovoid, in pairs near the ends of the branchlets, each pair subtended by 2–3 short ramuli. *Tetraspores* very prominent, globose, whorled round the articulations at or near the medial pellucid line. *Colour* a deep purple-red, becoming more crimsom in fresh-water. *Substance* soft, but not gelatinous. In drying the plant adheres to paper.

The very short, and nearly whole-coloured and equable joints seem to mark this small and not very common species.

B. Fig. 1. CERAMIUM ISOGONUM,—*the natural size*. 2. Branchlets, with favellæ. 3. A favella. 4. Branchlet, with tetraspores. *5. A tetraspore :—*magnified*.

P



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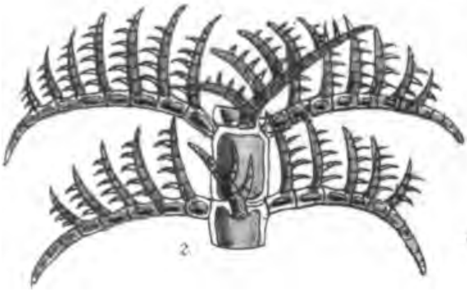

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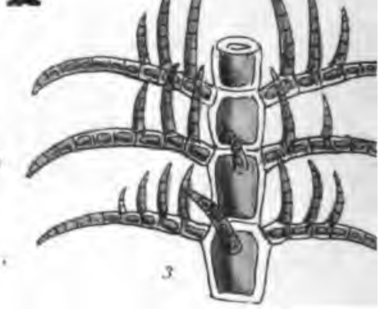

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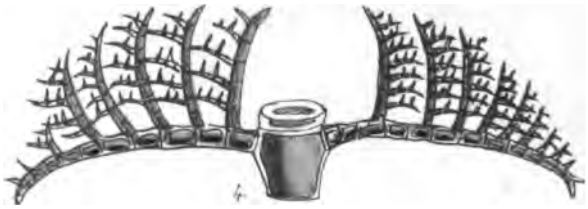

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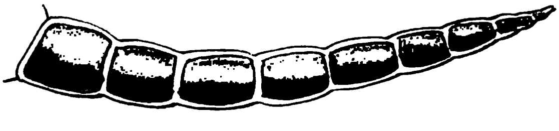

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PLATE CCVII.

CALLITHAMNION SIMILE, *Hook. fil. et Harv.*

EN. CHAR. *Frond* filiform, branched, articulated, monosiphonous, the stem and branches (in many species) at length thickened internally, or coated externally with decurrent filaments; ramuli always pellucidly articulate and monosiphonous. *Fructification:* 1, *favellæ* generally in pairs, axillary or sessile on the branches, naked, containing numerous angular spores; 2, *tetraspores* naked, sessile or pedicellate, distributed on the ramuli, generally triangularly parted.—CALLITHAMNION (*Lyngb.*), from *καλλις*, *beautiful*, and *θαμνιον*, *a little shrub.*

Frons filiformis, ramosa, articulata, monosiphonia, caule ramisque majoribus (in pluribus) demum fibris decurrentibus interne vel externe evolutis corticatis v. firmatis; ramulis semper pellucide articulatis. Fruct.: 1, *favellæ binatæ, axillares v. ad ramos sessiles, nudæ, sporas numerosas angulatas foventes;* 2, *tetrasporæ nudæ, ad ramulos sessiles v. pedicellatæ, triangulæ v. cruciatim divisæ.*

ALLITHAMNION *simile;* frond subsolitary, robust, rigid, much branched; branches alternately or subdichotomously decompound, articulated, ecorticate, at length hirsute, oppositely pinnate at every joint; pinnæ minute, opposite or tetrastichous, horizontally patent or recurved, pectinated above, more or less secundly compound; articulations of branches and ramuli once and a half to twice as long as broad, tips of the ramuli acute.

C. simile; *fronde subsolitaria crassa rigidiuscula distiche ramosissima; ramis alterne v. subdichotome decompositis articulatis ecorticatis demum hirsutis creberrime pinnatis, pinnis minutis oppositis v. tetrastichis horizontaliter patentibus recurvisve sursum pectinatis plus minus secunde decompositis; articulis omnibus brevibus diametro sesqui- v. subduplo longioribus, apicibus ramulorum acutis.*

CALLITHAMNION simile, *Hook. fil. et Harv. Fl. Ant. v.* 2. *p.* 489. *Kütz. Sp. Alg. p.* 648. *J. Ag. Sp. v.* 2. *p.* 30. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 561. *Harv. Alg. Exsic. Austr. n.* 543.

AB. On *Fucoideæ,* at King George's Sound and Rottnest Island, *W. H. H.* Fremantle, *G. Clifton.* Port Fairy, *W. H. H.* Sealer's Cove, *Dr. Mueller.*

EOGR. DISTR. Kerguelen's Land, *Dr. Hooker.* West and south coasts of Australia.

ESCR. *Root* discoid, afterwards a conical mass coated with curled fibres. *Fronds* erect, 1–5 inches high, either solitary or few together, distichously much branched; branches alternate erecto-patent, several times alternately divided.

All parts of the frond are, at first, pellucidly articulate, the articulations uniformly short, rarely twice or thrice as long as broad, and generally not more than 1½ as long; in the older fronds the main stem and the lower part of the principal branches are coated externally with short curled fibres, and become not only opaque but nearly ½ line in diameter. Every articulation of the frond emits 2 or 4, opposite or quadrifarious pinnæ, not more than ½ line long, spreading horizontally, at nearly right angles with the branches, and hooked back at the point. These pinnæ are variously compounded in unilateral, secund order; the simplest bear a few erect secund pinnules along their upper face; more compound bear a second series along their upper side; and the most compound bear a third series (see fig. 3, 2, 4). *Apices* of the pinnules acute. *Fruit* not observed. *Colour* a full crimson-red, rather darker in drying. *Substance* not very soft. The young frond adheres pretty closely, the older imperfectly to paper.

Young specimens of the present beautiful species bear a very near resemblance in habit and character to the *C. plumula* of Europe, and which is found, though very rarely, in Tasmania. They are chiefly to be known by their greater rigidity and the general shortness of the articulations. Old and full-grown plants are much more easily distinguished, for in them the main filaments and some of the larger branches become clothed with a gradually increasing stratum of woolly hairs, which finally completely cover the joints, and greatly increase the apparent diameter of the filament. The greate rrigidity of frond causes the branches and ramuli constantly to stand apart, so that the plant has a somewhat fan-like outline. Fruit, of both kinds, is still a desideratum.

Fig. 1. CALLITHAMNION SIMILE,—*the natural size.* Fig. 2, 3, 4, different articulations of the stem, with variously compound ramuli. 5. One of the ultimate pinnulæ:—*magnified.*

Plat

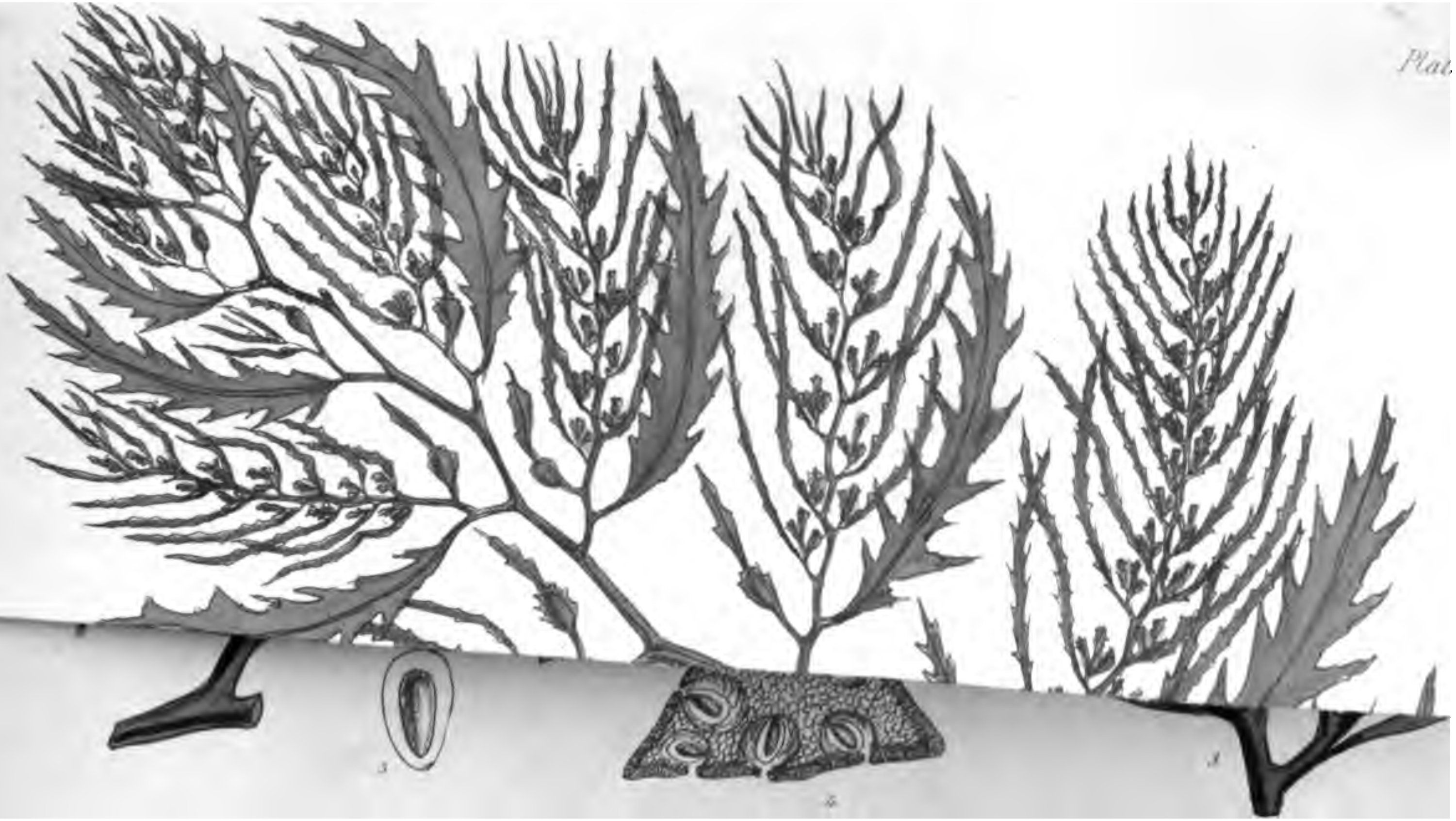


PLATE CCVIII.

SARGASSUM LACERIFOLIUM, *Ag.*

N. CHAR. *Root* scutate. *Frond* pinnately decompound, with distinct stem, branches, leaves, vesicles, and receptacles. *Vesicles* stipitate, supra-axillary, simple, most frequently mucronate or leaf-bearing. *Receptacles* pod-like, torulose or moniliform, axillary. *Scaphidia* diœcious. *Spores* obovoid.—SARGASSUM (*Ag.*), from the Spanish *sargazo,* a name give by navigators to floating seaweed.

Radix scutata. Frons pinnatim decomposita, caule proprio, ramis, foliis, vesiculis receptaculisque donata. Vesiculæ stipitatæ, supra-axillares, simplices, sæpissime mucronatæ v. foliiferæ. Receptacula siliquæformia, torulosa v. nodulosa, axillaria. Scaphidia dioica. Sporæ obovoideæ.

RGASSUM *lacerifolium;* stem sharply 4-sided; branches bent back at their insertion, issuing from the flat side of the branch; leaves of two forms, the lower lanceolate, deeply inciso-serrate, ribbed, the upper very narrow, nerveless, remotely but sharply serrate; vesicles ovoid, wing-bordered and tipped with a leaf; receptacles oblong, 3-angled, the prominent angles serrate, racemulose.

S. lacerifolium; *caule tetragono; ramis ad ortum retrofractis e latere plano egredientibus; foliis dimorphis, inferioribus lanceolatis profunde inciso-serratis costatis, superioribus angustissimis enerviis remote argute serratis; vesiculis ovoideis alato-marginatis folio coronatis receptaculis oblongis triquetris tristiche serratis racemulosis.*

SARGASSUM lacerifolium, *Ag. Sp. Alg. p.* 15; *Syst.* 298. *J. Ag. Sp. Alg. v.* 1. *p.* 300. *Harv. Alg. Exsic. Austr. n.* 20.

CARPACANTHUS lacerifolius, *Kütz. Sp. Alg. p.* 624.

FUCUS lacerifolius, *Turn. Hist. Fuc. t.* 167.

AB. Port Dalrymple, Tasmania, *R. Brown.* King George's Sound, rare, *W. H. H.*

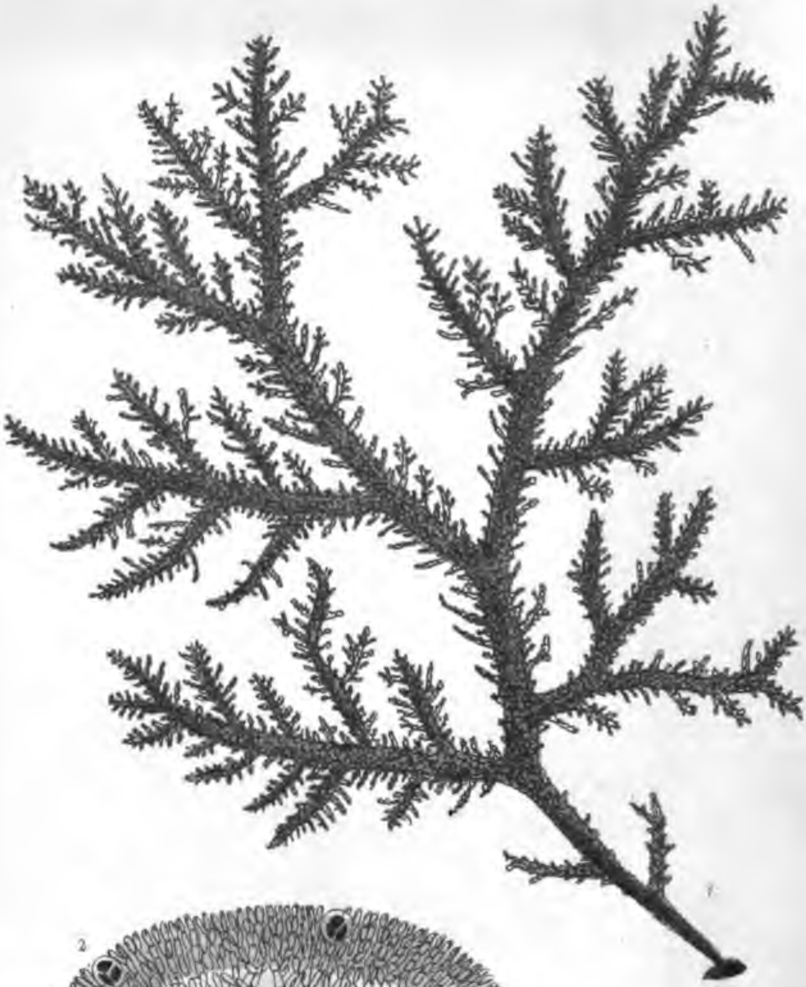
EOGR. DISTR. South-west of New Holland. Tasmania.

SCR. *Root* . . . *Stem* 2–3 feet long or more, 1–1½ lines in diameter, 4-angled, with sharply projecting angles, flexuous, pinnately decompound. Branches reflexed at their insertion, springing from the flat side of the stem, 6–12 inches long, diminishing upwards, angularly bent, 4-angled like the stem, or almost winged; the larger ones pinnated with a second series of similar, but smaller branches. *Leaves* of two kinds; those at the base of each branch, or of each division of a larger branch, lanceolate or linear-lanceolate, 2–4 inches long, 3–6 lines wide, midribbed, without glandular pores, deeply and sharply inciso-serrate or lacerate. The upper rameal leaves, and those subtending each tuft of receptacles very narrow-linear, sharply serrate, either wholly nerveless or with an obscure, immersed or obsolete midrib, 1–1½ inches long, ½–1 line wide. *Vesicles* few, one at the base of each branch, or of each division of a larger branch, on a flattened petiole, ovoid or subglobose, with a narrow wing-like border, tipped with a nerved and serrate leaf. *Receptacles* in alternate stipitate clusters of 2–3, each subtended by a narrow leaf, ranged in quasi-racemes along the minor pinnæ, the subtending leaves deciduous; each receptacle 1–2 lines long, thickened upwards, blunt, 3-ridged, the ridges toothed. *Spores* mostly solitary in each cavity. *Colour* brownish-olive. *Substance* coriaceous.

This would seem to be a very rare, although a widely distributed plant. Turner described and figured it from a solitary specimen, picked up by Mr. Brown at the mouth of the Tamar; and my figure is taken from another solitary specimen, collected by me in King George's Sound. Our figures, independently made, are, I think, sufficiently alike to show that we both aim at representing the same specific form; and I hope some of the many collectors in Australia who are now looking after *Algæ*, will pay a little more attention to the species of *Sargassum* than has hitherto been the case, and thus that we may ere long have a satisfactory knowledge of the present well-marked form.

Fig. 1. SARGASSUM LACERIFOLIUM,—*the natural size.* 2. A vesicle, tipped with its leaf. 3. Part of a leafy raceme of receptacles. 4. Cross section of a receptacle. 5. A spore,—*magnified.*

Plate CXL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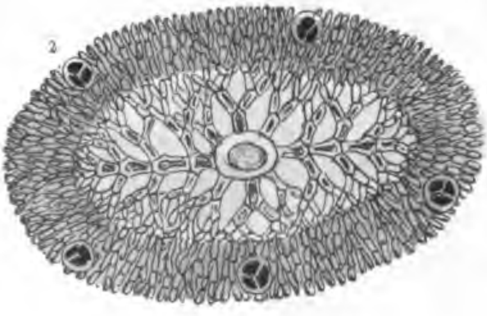

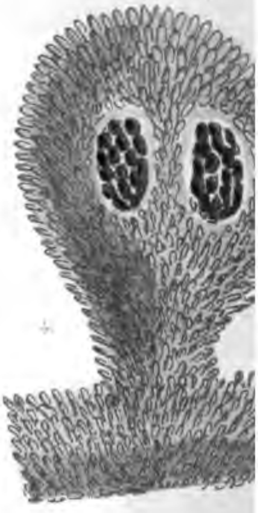
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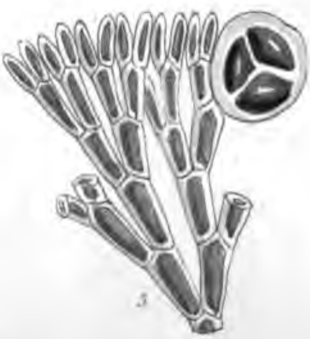
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Plate CCIX.

PTILOCLADIA PULCHRA, *Sond.*

Gen. Char. *Frond* compressed, pinnately decompound, sponge-like, formed of dichotomous, articulate, interwoven (and anastomosing?) ramelli, issuing from a central articulated axile filament; the apices of the ramelli fastigiate, forming the periphery of the frond. *Fructification:* 1, binate *favellæ,* immersed in the ultimate divisions of the frond; 2, tripartite *tetraspores,* attached to the peripheric ramelli.—Ptilocladia (*Sond.*), from *πτιλον, a feather* or *wing,* and *κλαδος, a branch;* because the branches are pinnately compound.

Frons compressa, pinnatim decomposita, spongiosa, contexta ramellis articulatis dichotomis crebre intertextis (anastomosantibus?) a filo centrali articulato infra genicula egredientibus; apicibus ramellorum fastigiatis peripheriam frondis constituentibus. Fruct.: 1, *favellæ binatæ, in divisuris ultimis immersæ;* 2, *tetrasporæ triangule divisæ, ad ramellos periphericos affixæ.*

Ptilocladia *pulchra,* Sond.

Ptilocladia pulchra, *Sond. in Mohl. and Schl. Bot. Zeit.* 1845, *p.* 52. *Pl. Preiss. v.* 2. *p.* 170. *Kütz. Sp. Alg. p.* 674. *J. Ag. Sp. Alg. v.* 2. *p.* 112. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 557. *Harv. Alg. Austr. Exsic. n.* 434.

Hab. Swan River, *Preiss!, Backhouse!* Garden Island, W. Australia, *W.H.H.* Fremantle, *G. Clifton* (306). S. Australia, *Dr. Curdie.*

Geogr. Distr. Western and southern coasts of Australia.

Descr. *Root* a mass of interwoven fibres. *Fronds* 4–6 inches high, 1–3 lines in breadth, compressed, distichously much branched; branches irregular, but in a more or less pinnate order; some specimens several times compounded and closely branched and branchleted; others distantly branched, with few and short lesser branches. The texture of the frond is sponge-like, and it is composed of a central, articulated filament or axis, which emits from the centre of every joint numerous small horizontal ramelli. These ramelli are dichotomous, many times forked, their branches closely interlaced together into the spongy mass of the frond, and seemingly here and there anastomosing. The ramelli forming the shorter diameter (in section) of the compressed frond are simply dichotomous; those that form the longer diameter have a simple rachis, pinnated with dichotomous branches. *Favellæ,* in structure quite like those of *Callithamnion,* are borne in special processes of the frond which stand out from the smaller pinnules, each on a short pedicel; but these processes are of the ordinary composition of the frond, though homologically to be considered as involucres. *Tetraspores* are immersed among the peripheric ramelli of other fronds, attached singly, here and there, near the apex of a ramellus. *Colour* a full, deep red, fading on exposure through pink to a dirty white. *Substance* soft, spongy; when young, rather gelatinous and adhering to paper; when old, dry and rigid.

Notwithstanding the robust and sponge-like frond, the plant here figured is so closely related in many respects to *Crouania*, that it may be questioned whether it ought to be kept generically distinct. Compared with *C. attenuata*, indeed, the resemblance is not very striking, but large specimens of *C. vestita* very much resemble the narrower and more branching fronds of *Ptilocladia;* nor is there any very essential character between the two genera. There is no difference in fructification; and the more or less compressed branches, and firmer, less gelatinous substance, are purely specific characters. I have not been able clearly to make out the anastomosis of the ramelli described by Sonder and J. Agardh; this character, if really present, must be held to be the most absolute, as distinguishing *Ptilocladia* from *Crouania*.

Fig. 1. PTILOCLADIA PULCHRA,—*the natural size*. 2. Cross section through a branch, showing a section of the central axile filament, the peripheric ramelli and some tetraspores *in situ*. 3. Apices of a ramellus, with an attached tetraspore. 4. External view of one of the ultimate divisions of the frond, containing a pair of *favellæ*:—*magnified*.

Plate CCX.

CURDIEA OBTUSATA, *Harv.*

Gen. Char. *Frond* flat, coriaceo-cartilaginous, laciniate, composed of two strata of cells; the inner stratum consisting of roundish angular cells, the outer of very minute, aggregated, subvertically seriated, coloured cellules. *Fructification* : 1, globose, sessile *coccidia*, containing, within a very thick pericarp, minute spores arranged in spore-threads issuing from a large, fleshy central placenta; cruciate *tetraspores* formed in superficial, intramarginal warts (*nemathecia*).—Curdiea (*Harv.*), in honour of Dr. Curdie, of Tandarook, Geelong, an early observer of Australian Algæ.

Frons plana, coriaceo-cartilaginea, laciniata, duplici strato constituta ; cellulis interioribus rotundato-angulatis majoribus extus sensim minoribus, exterioribus v. periphericis minimis coloratis verticaliter subseriatis. Fruct. : 1, *coccidia globosa sessilia, sporas minutas in filis ex placenta carnosa centrali radiantibus evolutas intra pericarpium cassum foventia ;* 2, *tetrasporæ cruciatim divisæ, in nematheciis intramarginalibus oblongis superficialibus evolutæ.—Alga rubro-sanguinea, siccitate rigida.*

Curdiea *obtusata;* frond brownish-red, membranaceo-coriaceous, irregularly dichotomous, multipartite ; axils and apices rounded or very obtuse; segments broadly linear, the broader subcuneate; coccidia scattered on the disc, depresso-umbilicate; nemathecia oval, prominent on both surfaces of the frond, seriated along the larger segments and under the axils.

C. obtusa; *fronde fusco-rubra membranaceo-coriacea vage dichotoma multipartita ; axillis apicibusque obtusissimis ; laciniis lato-linearibus v. cuneatis ; coccidiis in disco frondis sessilibus sparsis depresso-umbilicatis; nematheciis ovalibus in utraque pagina subprominentibus secus lacinias majores et infra axillas positis.*

Rhodymenia obtusata, *Sond.! in Pl. Preiss. v.* 2. *p.* 191. *J. Ag. Sp. Alg. v.* 2. *p.* 381. *Harv. Alg. Aust. Exsic. n.* 382.

Sphærococcus obtusatus, *Kütz. Sp. Alg. p.* 784.

Gymnogongrus firmus, *Aresch. in Ups. Trans. ser.* 3. *v.* 1. *p.* 354.

Hab. Swan River, *Preiss, Mylne.* Rottnest Island, W. Australia; and Western Port, Victoria, *W. H. H.* Port Phillip, *Areschoug.* Port Phillip Heads, *T. E. Rawlinson* (with cystocarps).

Geogr. Distr. Western and southern shores of Australia.

Descr. *Root* discoid. *Fronds* tufted, 4–6 inches high and as much in the expansion of the branches, flabelliform, more or less fastigiate, divided nearly from the base in a subdichotomous or occasionally digitate manner. ciniæ quite flat, 3–4 lines wide, slightly undulate, linear, or the lowe broader ones somewhat cuneate, especially under the fork, all patent very obtuse and broad axils and very blunt apices. *Cystocarps* sess disc of the frond, scattered, prominent to one surface, not in the lea mersed, hemispherical, contracted at base, depressed and umbilicate apex, at length pierced by a terminal pore; pericarp very thick, fr seriated, radiating cellules; placenta quite filling the cavity, sinuated upper surface, and connected by bars with the over-arching pericarp. very minute, covering the indentations of the placenta. *Nematheci* or oblong, or when occurring beneath an axil cordate, ranged in sin along the larger segments, prominent on both surfaces of the frond; seen in a young state, before the formation of tetraspores. *Colour* dark red-brown, becoming much darker and almost black in the herb The *substance* is toughly coriaceous, rigid when dry; not adhering to

When the figure of this plant was prepared, I had not conceptacles (*cystocarps*), which I find on a specimen rec received from Mr. T. E. Rawlinson, of Melbourne. An exa tion of these shows the peculiar placentation of *Sphærococco* and though the structure is not exactly identical with that of *diea laciniata* (Plate XXXIX.), the typical species, I prefer sidering the present species as a *Curdiea*,—with which in of its characters it agrees—to founding a new genus for i ception. The substance and structure of the frond agree with those of *C. laciniata;* and though the colour in that sp is very much brighter when recent, yet both plants agree i coming much darker in drying. It remains to be seen wh the *tetraspores* in the ripe nemathecia, be formed on the of those of *Curdiea.*

I venture to quote Areschoug's *Gymnogongrus firmus* synonym, although I have seen no specimen of his plant. description answers very well to my Western Port and Phillip specimens; and if not intended for this plant, it refer to something unknown to me.

Fig. 1. CURDIEA OBTUSATA,—*the natural size.* 2. Portion of the frond *nemathecia,—somewhat magnified.* 3. Section through the frond and i ture nemathecia. 4. Small portion of an immature nemathecium :– *nified.*

PLATE CCXI.

THYSANOCLADIA LAXA, *Sond.*

GEN. CHAR. *Frond* flat or compressed, distichously decomposito-pinnate, formed of three strata of cells; the medullary of densely interwoven, slender, longitudinal filaments; the intermediate of roundish-oblong cells; the cortical of minute, vertically arranged cellules. *Fructification:* 1, half-immersed conceptacles, containing, within a thick pericarp, minute *spores* arranged in spore-threads radiating from a large placenta; 2, *tetraspores?*—THYSANOCLADIA (*Endl.*), from θυσανος, *a fringe*, and κλαδος, *a branch.*

Frons plana v. compressa, disticha decomposito-pinnata, triplici strato contexta; medullari filis longitudinalibus tenuibus articulatis densissime intertextis, intermedio cellulis majusculis rotundato-oblongis, corticali cellulis minimis verticaliter seriatis coloratis composito. Fruct.: 1, *cystocarpia semi-immersa, intra pericarpium crassum sporas minutas in filis a placenta magna radiantibus ordinatis foventia; tetrasporæ?*

THYSANOCLADIA *laxa;* frond livid-purple, drying brown, flat, below thickened in the centre, and sometimes ribbed, quite ribless above, distichously decompound-pinnate; pinnæ broadly linear, approximate, patent, subopposite; pinnules suberect, broadly linear, flat, narrowed at base, simple or 3-forked, or pinnulate; axils of the pinnæ rounded; sori of tetraspores in the dilated apices of the branches.

T. laxa; *fronde livido-purpurea siccitate fuscescente plana, inferne medio-incrassata v. subcostata, superne ecostata, disticha decomposito-pinnata; pinnis lato-linearibus approximatis patentibus oppositis; pinnulis erectiusculis lato-linearibus planis basi angustatis simplicibus v. trifurcis pinnulatisve; axillis pinnularum eximie rotundatis; soris tetrasporarum in apicibus dilatatis immersis.*

THYSANOCLADIA laxa, *Sond. in Linn. v.* 25. *p.* 689. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 550. *Harv. Alg. Austr. Exsic. n.* 310.

HAB. Rivoli Bay, *Dr. Mueller!* Rottnest, West Australia, *W. H. H.*

GEOGR. DISTR. Western and southern coasts of Australia.

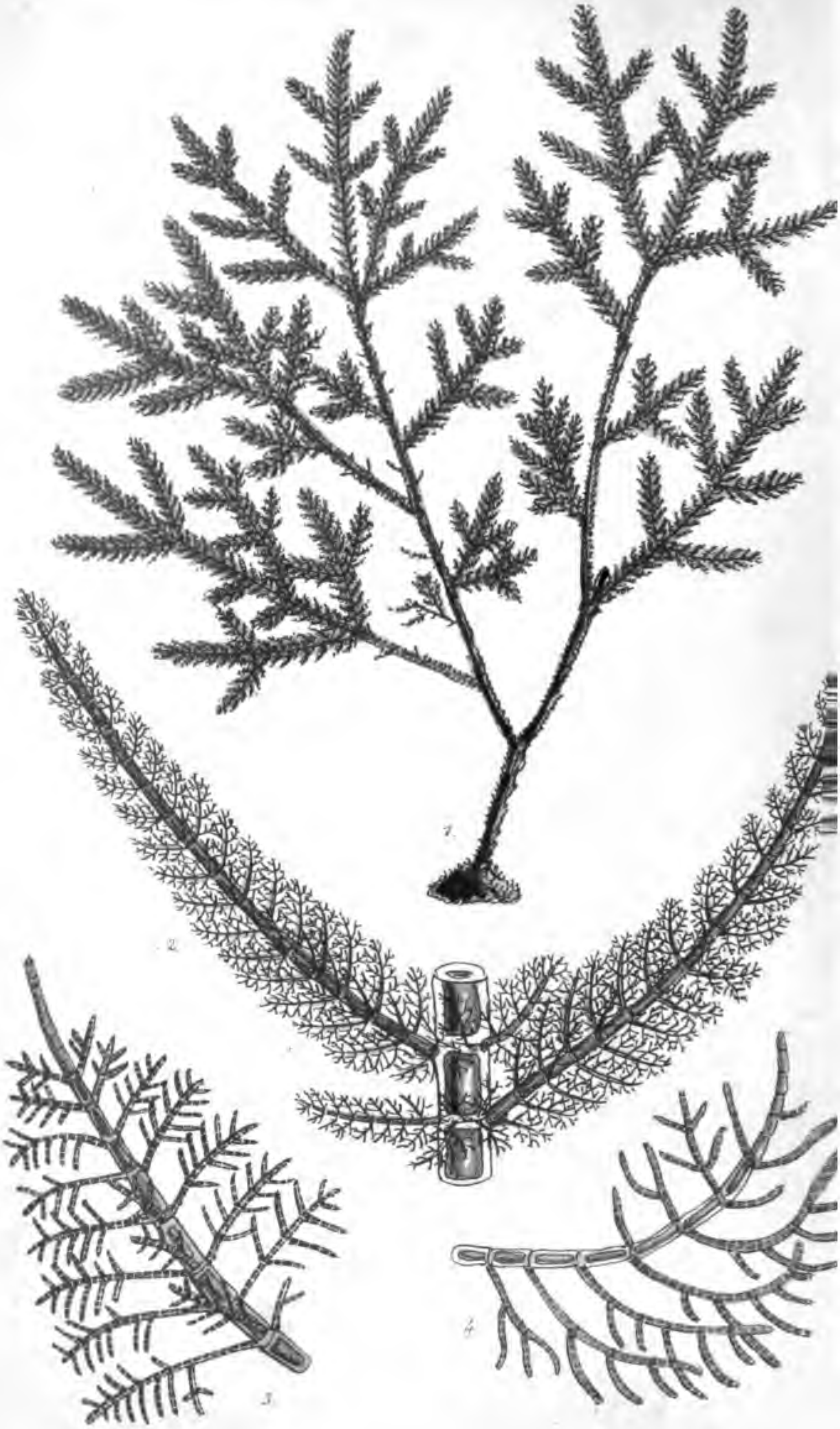
DESCR. *Root . . . ? Fronds* about a foot in height, and as much in the expansion of the branches, 1–3 lines wide, terete at base for one or two inches, thence upwards quite flat and nerveless, or merely thickened in the centre, pinnately decompound, distichous. *Pinnæ* patent or subhorizontal, the lowest longest, the upper gradually shorter, opposite or nearly so, close together or slightly distant, all naked for a short distance at base, and oppositely pinnate or bipinnate in their upper part. All the axils and apices are remarkably obtuse: the lesser pinnæ are somewhat, but not greatly narrower than the larger, and all are perfectly entire and flat. The *cellular* structure is exactly that proper to the genus. No *conceptacles* have been seen. The *colour* when recent is dull, somewhat livid-purple; in the herbarium it is a dark reddish-brown. The *substance* is coriaceous, firm and tough. In drying the fronds do not adhere to paper.

In its dull-purple colour this species differs from other *Thysanocladiæ*, while in general habit, in tough and rigid substance, and in the cellular structure of the frond, it agrees with all the species. The colour is more like that of many *Laurenciæ*, but the substance is far more rigid than in any of that genus. Sonder compares his plant with *T. oppositifolia*. If mine be specifically the same, there is not much danger of these species being mistaken for one another, the much broader frond, the flattened pinnules, and the colour sufficiently marking the present plant.

It appears to be a rare species; and, like all the others, is a deep-water plant.

Fig. 1. THYSANOCLADIA LAXA,—*the natural size*. 2. A cross section through the frond,—*magnified*.

Plate



Vincent Broo

Plate CCXII.

BALLIA MARIANA, *Harv.*

Gen. Char. *Frond* filiform, rigid, dendroid; the stem and branches covered with a plexus of hair-like short fibres; ramuli pellucidly articulate, pinnately decompound. *Fructification:* 1, involucrate *favellæ*, terminating short pinnæ, and containing numerous angular spores; 2, *tetraspores* borne on the hair-like fibres of the stem and branches. —Ballia (*Harv.*), in honour of Miss Anne E. Ball, a distinguished Irish algologist.

Frons filiformis, rigida, dendroidea, caule ramisque plexu filorum brevium quasi hirsutis; ramuli pellucide articulati, pinnatim compositi. Fruct.: 1, *favellæ involucratæ, in pinnula abbreviata terminales, sporas numerosas angulatas foventes;* 2, *tetrasporæ triangule divisæ, in filis caulinis evolutæ.*

Ballia *Mariana;* penultimate branchlets (or *plumules*) incurved, tristichous or tetrastichous, very unequal; all but one very short and irregularly multifid or pinnate; the long one closely pinnated with tristichous or tetrastichous lesser plumules (*plumellæ*); these plumellæ patent, pinnate or bipinnate, with an excurrent rachis; the ultimate ramuli very slender, cylindrical, obtuse, opposite or often secund.

B. Mariana; *plumulis incurvis tristichis v. tetrastichis valde inæqualibus,* 2–3 *brevissimis vage multifidis v. pinnatim compositis, uno elongato creberrime plumellis tristichis v. tetrastichis pinnato; plumellis patentibus pinnatis v. bipinnatis rachide excurrente; ramulis ultimis tenuissimis cylindraceis obtusis oppositis v. sæpe secundis.*

Ballia Mariana, *Harv. in Tayl. Ann. Nat. Hist. for May,* 1855, *p.* 335. *Harv. Alg. Exsic. Austr. n.* 499.

Hab. Port Fairy, *W. H. H.* Warnambool, *H. Watts* (57).

Geogr. Distr. South coast of Australia.

Descr. *Root* a conical mass of woolly fibres. *Fronds* solitary, 6–8 inches long or more, distichously branched; the principal branches (on old fronds) irregular, subopposite, alternate or scattered; on young fronds pretty regularly subopposite, all patent, the lowest longest and most compound. *Branches* pinnated throughout with minute and larger plumose ramuli, or plumules, which are alternately inserted distichously along each rachis: 2 or 4 or 6 of these "plumules," placed in proximate opposition at intervals of ½ inch, are branch-like, ½–1 in long and similarly plumulate as the branches; the rest are 2–3 lines long, incurved. These smaller plumules are *alternate;* but opposite their bases is a very small plumule, and circling the branch at each node are 3–4 or more still smaller and more irregularly divided ramuli. The alternating plumules have a filiform rachis, formed of cylindrical cells, each 3–4 times longer than broad, and are close whorled with tristichous or tetrastichous pinnæ; the *pinnæ* very slender, and bipinnate or subtripinnate. *Articulations* of the ultimate ramuli as long as broad; apices blunt. *Fruit* not seen. *Colour* a deep full red. *Substance* firm and rather rigid. In drying it imperfectly adheres to paper.

In external aspect, and in the alternately opposite long and short ultimate branchlets or "*plumules,*" this beautiful species nearly resembles *B. Robertiana* (Plate XXXI.), but in microscopic characters the two are very distinct. A comparison of our figures is sufficient to prove this, Fig. 2 in each plate representing similar pieces of each plant. In *B. Robertiana* the opposite divisions or pinnæ of the plumule are distichous, with simple pinnules lying so close one on another that each pinna looks like an ovate serrated leaflet. In *B. Mariana* the pinnæ are either tristichous or tetrastichous, their pinnules are compound and very slender, and every fibre stands apart, giving a feathery character to the whole plumule. There are other minor characters which need not be further insisted on.

This is by much the rarest species of *Ballia,* and has not yet been found in fruit.

Fig. 1. BALLIA MARIANA,—*the natural size.* 2. Opposite or whorled, alternately very unequal plumules. 3. A "plumella" from the larger plumule. 4. One from one of the smaller,—*magnified.*

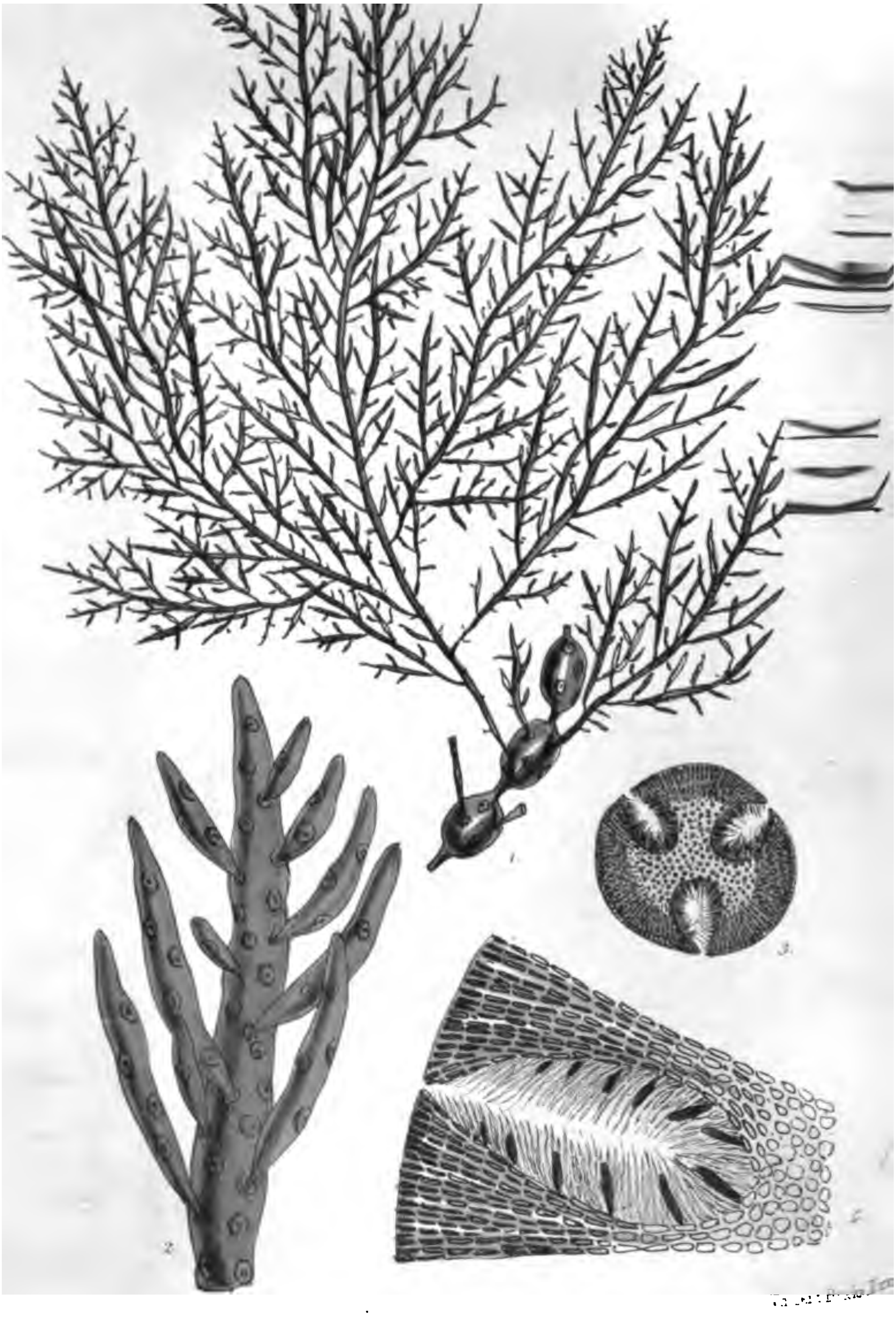

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PLATE CCXIII.

NOTHEIA ANOMALA, *Bail. et Harv.*

GEN. CHAR. *Frond* parasitic, filiform, irregularly branched, proliferous, solid. *Scaphidia* scattered over the whole frond, hollowed out in the cortical stratum below the surface, spherical, opening through a canal into a superficial ostiole. *Spores* linear-obovate, parietal. *Paranemata* simple.—NOTHEIA (*B. et H.*), from *νοθεια, a spurious thing.*

Frons parasitica, filiformis, vage ramosa, prolifera, solida. Scaphidia per totam frondem sparsa, in strato corticali infra superficiem excavata, sphærica, cum ostiolo superficiali per canalem communicantia. Sporæ lineari-obovatæ, parietales. Paranemata simplicia.

NOTHEIA *anomala,* Bail. et Harv.

NOTHEIA anomala, *Bail. et Harv. Alg. Wilkes, cum icone. Harv. in Fl. N. Zeal. v. 2. p.* 216. *t.* CIX. A. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 534. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 287.

HAB. Parasitical on *Hormosira Banksii.* At Port Fairy, and at Port Phillip Heads, *W. H. H.* Tasmania.

GEOGR. DISTR. South coasts of Australia. Tasmania. New Zealand.

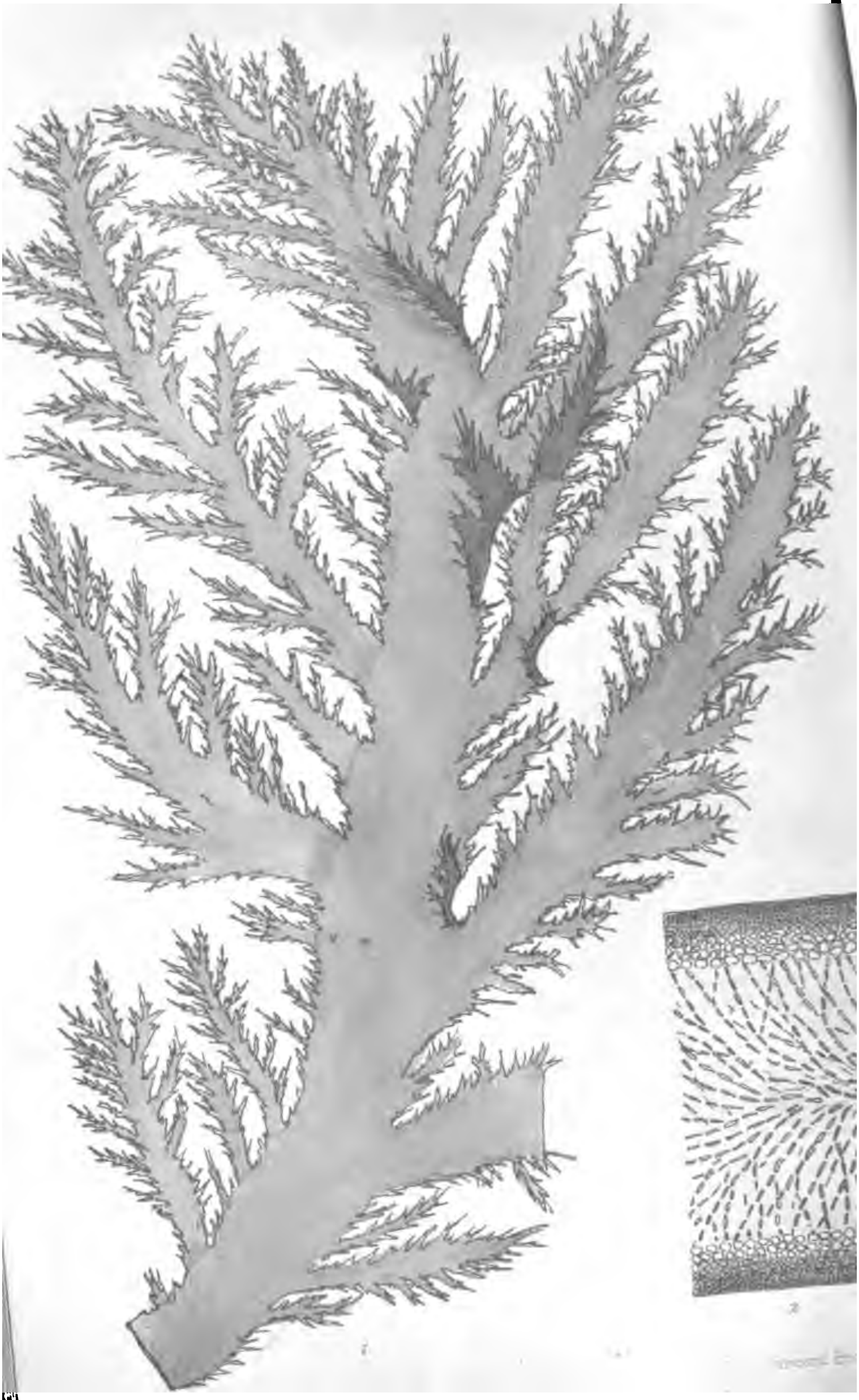
DESCR. *Root* parasitical, inserted into the spore-cavity of *Hormosira Banksii. Fronds* solitary from each cavity, 3–8 inches long, ½–1 line in diameter, at first simple, afterwards excessively branched and bushy, the branches and ramuli proliferous, each one springing from one of the spore-cavities of an older branch. The frond is cylindrical, and each of its branches and ramuli is linear-fusiform, much attenuated at the insertion, and tapering to a more or less acute apex; the axis is solid, composed of longitudinal interwoven filaments; the periphery of subhorizontal, parallel, radiating, slender, coloured filaments. *Spore-cavities* (*scaphidia*) are abundantly scattered over all parts of the frond, and communicate with the surface through a gland-like pore. They appear to be diœcious; but only spore-producing cavities have yet been seen. The *spores* are very narrow, linear-oblong, parietal, growing among copious simple paranemata. The *colour,* when recent, is a pale brownish or yellowish olive or horn-colour; in the herbarium it turns very dark or almost black. The *substance,* when recent, is between cartilaginous and coriaceous; when dry, rigid and brittle. The young plant adheres to paper.

This little plant abounds wherever *Hormosira Banksii* grows commonly, and is always strictly parasitical upon that species, being the only known *Fucoid* which is truly a parasite. The *Notheia* grows constantly upon the spore-cavity of the *Hormosira*, and its fronds, however different in aspect, have just so much affinity in development with those of *Hormosira* that one is tempted to guess at the *possibility*, at least, of this parasite being an *abnormal* proliferous growth from the hymenium of the nobler species. Were the occurrence of the *Notheia* rare, such a view would be strengthened; but it is far too common along a great extent of coast, and far too *regular* in its development, to favour such an opinion, in the absence of direct evidence of its truth. There is also, in the development of the frond, a greater affinity with *Splachnidium* than with *Hormosira*.

The *spores*, in the specimens examined, are scarcely fully organized, and no *antheridia* have been observed.

This parasite was first collected by the naturalist attached to Captain Wilkes's Exploring Expedition.

Fig. 1. NOTHEIA ANOMALA,—*the natural size*. 2. Part of a branch, with ramuli. 3. Cross section of a ramulus through three *scaphidia*. 4. One of the *scaphidia* or spore-cavities :—*magnified*.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Ser. RHODOSPERMEÆ. Fam. *Cryptonemiaceæ.*

PLATE CCXIV.

HALYMENIA FLORESIA, *Ag.*

GEN. CHAR. *Frond* terete, compressed or flat, gelatinoso-membranaceous, dichotomous or pinnatifid, composed of two strata; the *medullary* stratum formed of a few, laxly interlaced, branching filaments, lying in gelatine; the *cortical* membranous, formed of minute, coloured cellules. *Fructification:* 1, *favellæ* immersed in the frond, suspended under the peripheric stratum; 2, cruciate *tetraspores,* scattered through the surface-cellules.—HALYMENIA (*Ag.*), from ἁλς, *the sea,* and ὑμην, *a membrane.*

Frons teres, compressa v. plana, gelatinoso-membranacea, dichotoma v. vage pinnatifida, stratis duobus composita; strato medullari ex filis paucis laxe intricatis ramosis succo gelatinoso immersis, peripherico membranaceo cellulis minutis coloratis formato. Fruct.: 1, *favellæ frondi immersæ, infra stratum periphericum suspensæ;* 2, *tetrasporæ sparsæ, cruciatim divisæ.*

HALYMENIA *Floresia;* frond softly membranous and slippery, flat, stipitate, elongate, pinnately decompound; the pinnæ and pinnules broadly linear or oblong, acuminate, spreading, either entire or serrato-lacerate and ciliate.

H. Floresia; *fronde gelatinoso-membranacea plana stipitata elongata pinnatim decomposita; pinnis pinnulisque lato-linearibus v. oblongis acuminatis patentibus integris v. sæpius serrato-laceratis ciliatisve.*

HALYMENIA Floresia, *Ag. S. Alg. p.* 209; *Syst. p.* 243. *J. Ag. Alg. Medit. p.* 96. *Mont. Canar. p.* 163; *Fl. Alg. p.* 114. *Kütz. Sp. Alg. p.* 716. *J. Ag. Sp. Alg. v.* 2. *p.* 205. *Harv. Ner. Bor. Amer. Part* 2. *p.* 193; *Austr. Exsic. n.* 435.

FUCUS Floresius, *Clemente. Turn. Hist. t.* 256.

FUCUS Proteus, *Del. Egypt. t.* 58. *f.* 1–4.

HAB. South Beach, Fremantle and Garden Island, *G. Clifton, W. H. H.* Port Phillip Heads, *W. H. H.*

GEOGR. DISTR. Mediterranean Sea. North-west coast of Africa. Canary Islands. Red Sea. Gulf of Mexico. Carthagena, New Granada, *Schott!* Port Natal, South Africa, *Sanderson!*

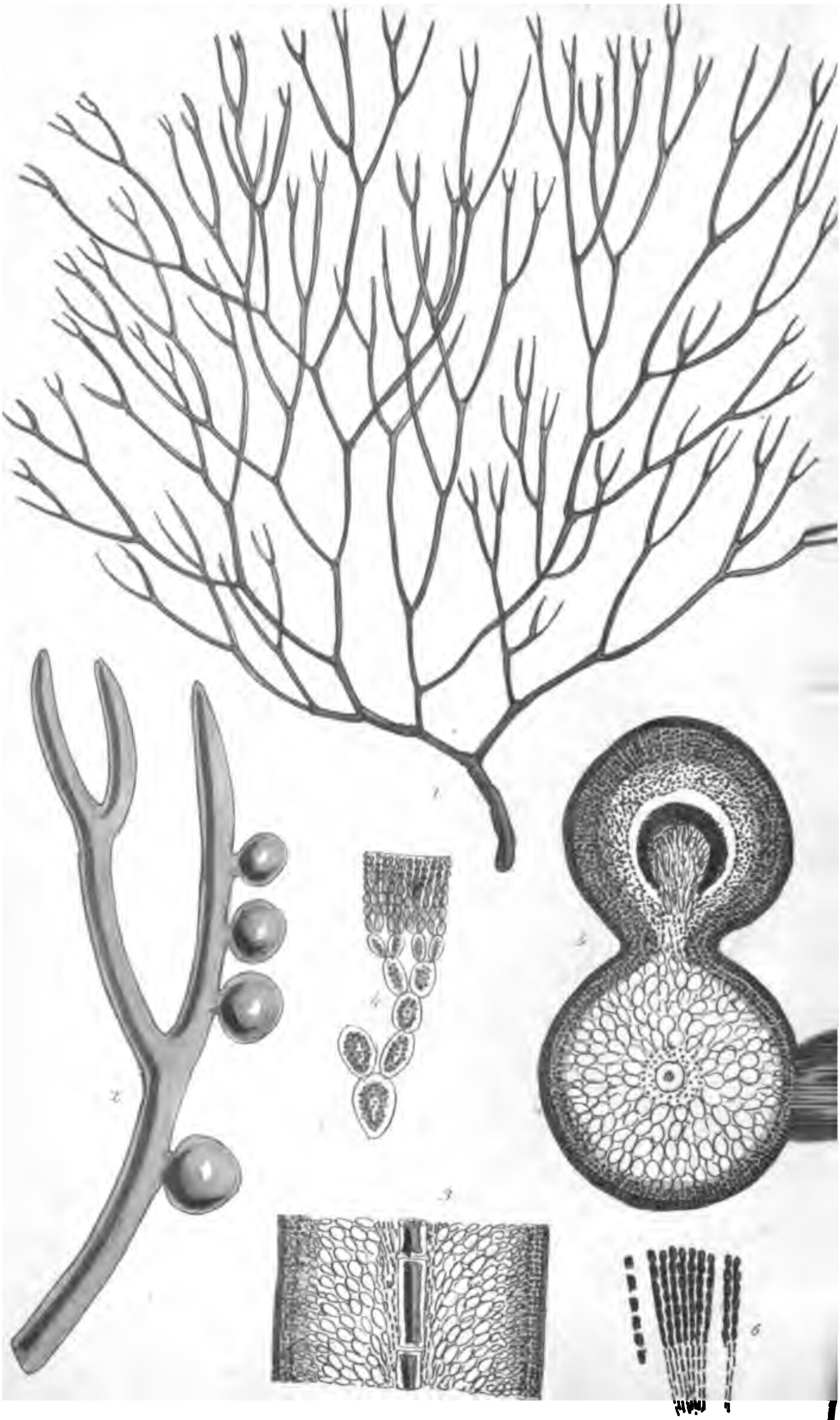
DESCR. *Root* a minute disc. *Frond* rising with a slender, compressed, linear stipes, that soon becomes cuneiform, and gradually passes into the base of a broadly linear principal lamina, 6–12 or 18 inches long, and ½–¾ or 1½ inches wide. This principal lamina or rachis is either simple or forked, or multifid, and is set throughout with approximate or subdistant lateral branches or pinnæ, which are furnished with a second or third series of lesser divisions. The form and ramification and size are much va margin in some specimens is quite flat and entire, in others slightl and in others deeply cut, serrated, and fimbriato-lacerate, either fl lated, or curled. The apices of all the branches and of their lesser are very acute; those of the smaller ones much acuminated. No on the Australian specimens. *Colour* a bright pinky-red, soon di with decomposition, in fresh-water. *Substance* very softly gelatinou times distended. In drying this plant adheres most closely to pa

Halymenia Floresia, a widely-distributed species, is v riable in ramification on almost all the shores on whi found; specimens from the same locality differing as m from another as those that may be brought from the end earth. In all its states, however, it is recognized from th est species by the very sharp or attenuated, marginal or t segments and lobes. Some of Mr. Clifton's specimens great size and breadth, and amply furnished with marginal quite like what I collected at Port Phillip; while some Fremantle specimens, that grew side by side with Mr. C are narrow and bare, like a common form found at Ven Trieste.

On comparing Australian individuals with those from I find the frond to be thicker and the cellular substanc dense, but not so decidedly the one or the other as to valid distinction. Externally there is no difference to be

Fig. 1. HALYMENIA FLORESIA,—*the natural size.* 2. Section of the *magnified.*

Plate



Vincent Brooks Imp.

PLATE CCXV.

HERINGIA FURCATA, *Harv.*

GEN. CHAR. *Frond* cartilaginous, filiform or compressed, subdichotomous, fastigiate, composed of two strata surrounding a central, articulated filament; the *inner* statum of ovoid cellules, diminishing toward the surface, and set in erecto-patent, moniliform, excurrent series; the *cortical* of minute, coloured, vertically seriated cellules. *Fructification:* 1, external *cystocarps* (*coccidia*) containing, within a thick pericarp, minute, oblong spores, set in moniliform, fastigiate filaments, rising from a basal placenta; 2, oblong, zonate tetraspores, immersed in the periphery of the frond, below the apex of the segment.—HERINGIA (*J. Ag.*), in honour of Dr. Hering, a German algologist.

Frons cartilaginea, filiformis v. compressa, subdichotoma, fastigiata, duplici strato tubum articulatum centralem ambiente contexta; strato interno cellulis ovoideis versus superficiem minoribus in filis ramosis erecto-patentibus moniliformibus excurrentibus ordinatis, corticali cellulis minimis coloratis verticaliter seriatis. Fruct.: 1, *coccidia intra pericarpium crassum sporas minutas oblongas in filis moniliformibus fastigiatis e placenta basali egredientibus ordinatas foventia;* 2, *tetrasporæ oblongæ, zonatim partitæ, in peripheria frondis infra apices ramorum immersæ.*

HERINGIA *furcata;* frond terete, repeatedly forked, the divisions erecto-patent, with rounded axils and acute apices; conceptacles lateral, scattered, subsessile.

H. furcata; *fronde tereti pluries furcata, divisuris erecto-patentibus, axillis rotundatis, apicibus acutis; coccidiis lateralibus sparsis.*

HERINGIA furcata, *Harv. Alg. Austr. Exsic. n.* 311.

HAB. South Australia, *Dr. Curdie.* Port Phillip Heads, *W. H. H.* Warnambool, *H. Watts.*

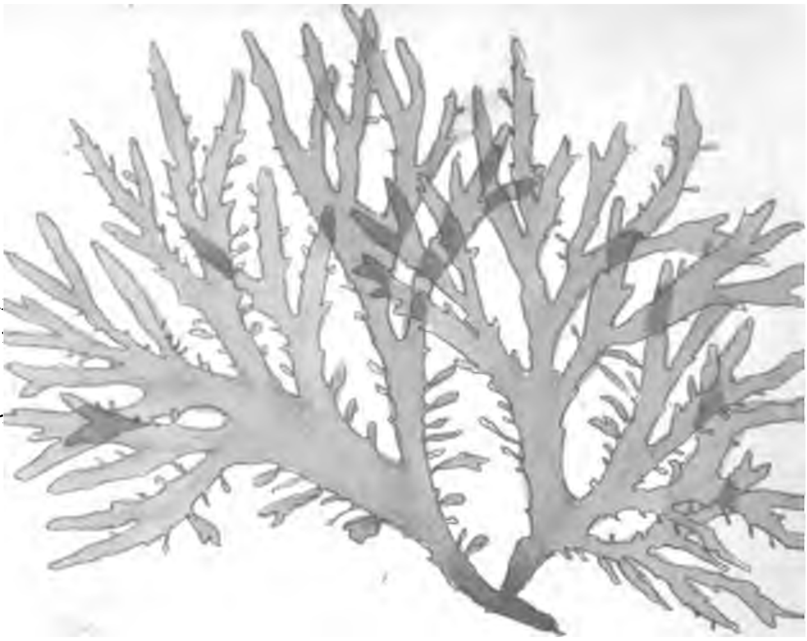
GEOGR. DISTR. South coast of Australia.

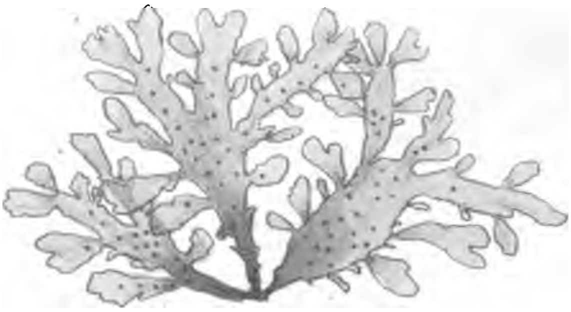
DESCR. *Root? Frond* terete, filiform, thickened at base or rising from a short, cylindrical, undivided stem (which is 1½ lines in diameter, and an inch or more in length), multipartite, 4–6 inches or more in length, somewhat flabelliform, fastigiate, either regularly dichotomous, many times divided, or, in old fronds, the larger segments often throw out from their sides dichotomously divided, fastigiate branches. The frond throughout is nearly of equal diameter, about twice or thrice as thick as hog's-bristle. *Cystocarps* globose, subsessile or minutely pedicellate, distributed along the sides of the branches, solitary or several together in secund order, each about the size of a poppy-seed. *Tetraspores* unknown. *Colour* a full deep-red, becoming much darker in drying. The substance is firmly cartilagineo-coriaceous, becoming hard and horny when dry. The frond very imperfectly adheres to paper in drying.

To the genus *Heringia,* founded by Professor J. Agardh, on a South African parasitic Alga, I have ventured to add two Australian species of nearly similar organization and fruit, the larger of which is here figured. Both appear to be of rare occurrence. For the only fruiting specimen of *H. furcata* seen by me I am indebted to Mr. H. Watts, of Warnambool, who has kindly furnished me with many of the rarer Algæ of the coast in his neighbourhood.

Distinctly characterized as the present plant appears to be, and nearly as it agrees with *H. mirabilis* in structure, I am not altogether assured of its being a *genuine* production at all, but (paradoxical as it may seem) *possibly* a divarication of *Phacelocarpus!* Such a parentage appears little likely to one who merely looks at the ramification; but there is something in the *structure* of the stem and in the fruit which at least indicates an affinity with *Phacelocarpus;* and on one of my specimens I detect two "sprigs" of *Ph. Labillardieri* springing from the axils in different parts of the frond; but whether springing *proliferously* or *parasitically* it is impossible to say. I recommend the point to the notice of observers in Australia. Should my suspicions prove correct, the present would be one of the most remarkable cases of *transformation* on record.

Fig. 1. HERINGIA FURCATA,—*the natural size.* 2. Apex of a fertile branch, with conceptacles. 3. Longitudinal section of the frond. 4. Minute portion of the periphery. 5. Cross section through a branch, and one of the *conceptacles.* 6. Spore-strings:—*magnified.*





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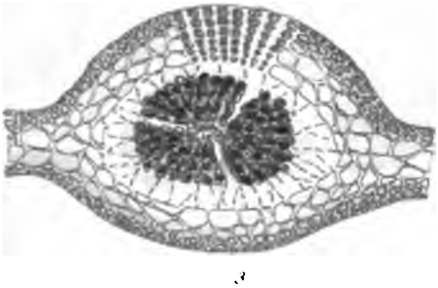

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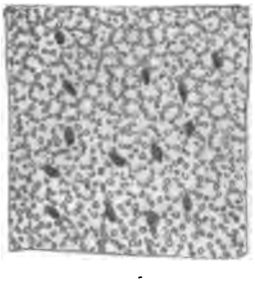

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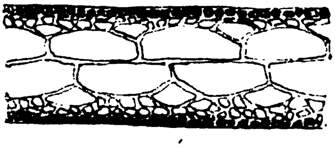

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6

Plate CCXVI.

RHODOPHYLLIS VOLANS, *Harv.*

GEN. CHAR. *Frond* flat, membranous, dichotomously or pinnately decompound, mostly margined with leafy or slender processes, and composed of two strata of cells; the medullary stratum formed of roundish-angular cells, the cortical of coloured cellules in one or few rows. *Fructification:* 1, marginal, external conceptacles, containing within a pericarp formed of radiating filaments, a compound nucleus, formed of bundles of spore-threads radiating from a basal (or central) placenta; 2, zonate *tetraspores*, immersed in the peripheric cells of the segments or margined processes.—Rhodophyllis (*Kütz.*), from ῥοδεος, *red,* and φυλλον, *a leaf.*

Frons plana, membranacea, dichotome v. pinnatim decomposita, segmentisque ciliisve marginalibus obsita, stratis duobus contexta; strato medullari cellulis rotundato-angulatis, corticali cellulis coloratis uni- v. pauci-seriatis composito. Fruct.: 1, *cystocarpia marginalia, externa, pericarpio filis moniliformibus radiantibus conflato munita, nucleum compositum ex fasciculis filorum radiantium formatum foventia; filis demum in sporas solutis;* 2, *tetrasporæ zonatim divisæ, fronde v. lacinulis marginalibus immersæ.*

Rhodophyllis *volans;* tufted, springing from interwoven fibres; frond membranous, rosy, subdichotomous or irregularly divided; segments linear, spreading, simple at the margin, or more generally pinnated; pinnæ oval or oblong, obtuse, narrowed to the base, subpetiolate; cystocarps scattered over the disk of the frond; tetraspores in the pinnæ, zonate.

R. volans; *cæspitosa, e filis intertextis orta; fronde membranacea rosea subdichotoma vel vage partita; segmentis linearibus patentibus margine simplicibus vel sæpissime pinnatis; pinnis ovalibus oblongisve obtusis basi attenuatis subpetiolatis; cystocarpiis per discum frondis sparsis; tetrasporis in pinnis nidulantibus zonatim divisis.*

Rhodophyllis volans, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 554; *Alg. Austr. Exsic. n.* 367.

Hab. Cast ashore. King George's Sound and Rottnest Island, *W. H. H.* Garden Island and Fremantle, *G. Clifton.*

Geogr. Distr. West and south-west coasts of Australia.

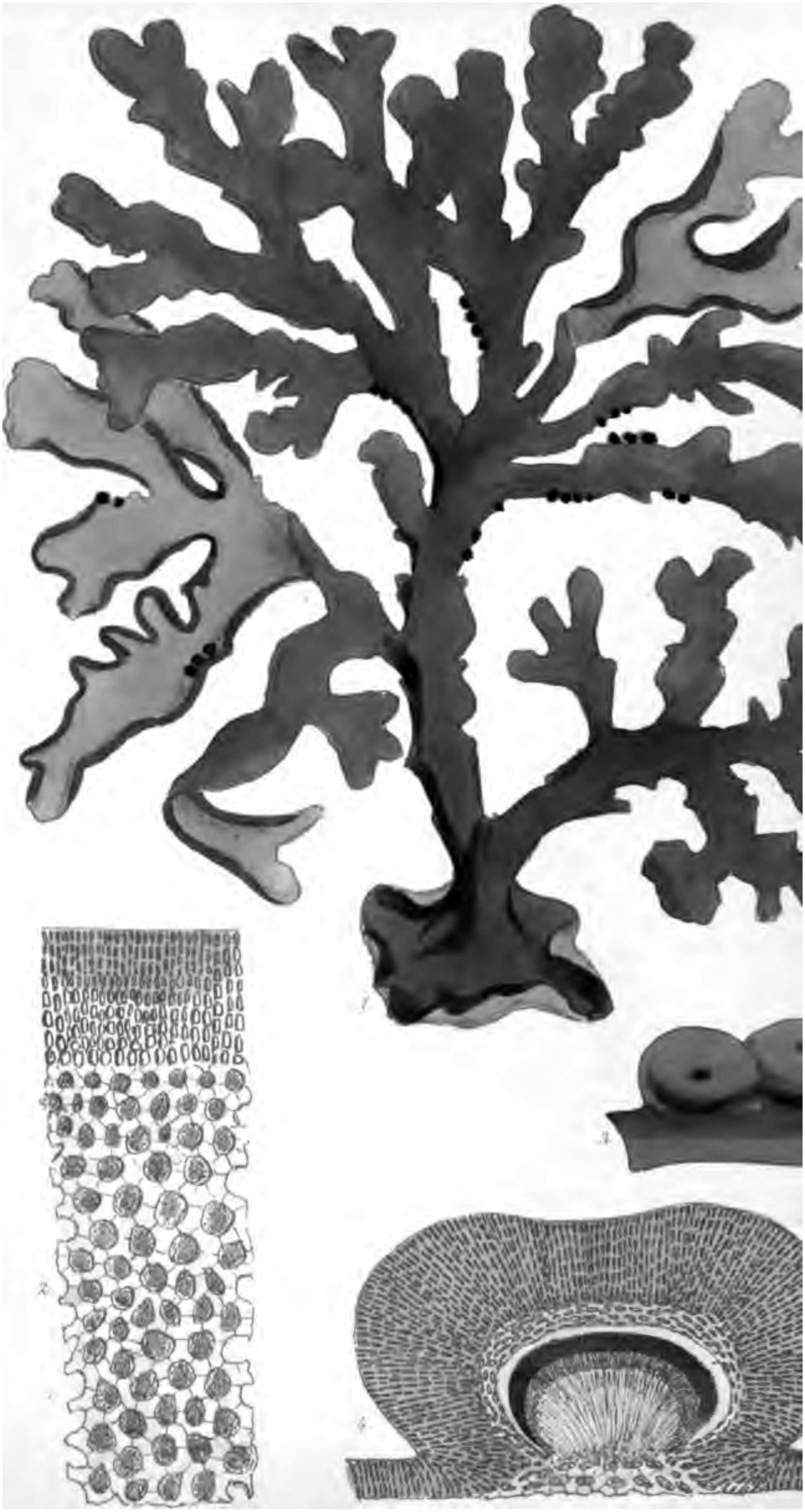
Descr. *Root* composed of a few, short, interwoven fibres. *Fronds* tufted, 2–4 inches long, somewhat flabelliform in outline, multipartite, the segments from a quarter to half inch broad. The ramification varies considerably in different specimens; sometimes the frond is nearly regularly dichotomous

with few lateral processes or with none; sometimes it is digitate; and
times, after one or two forkings of the main segment, the general ra
tion is irregularly pinnate. Usually the margin emits lateral, leaf-lik
ments or pinnæ, which commence as short and blunt lobules, and gra
increase till they are ½–1 inch long, and ¼–½ inch wide, becoming o
oval, or obovate. All the apices are blunt, and the margin is fla
curled. *Cystocarps* irregularly scattered over the whole surface, prom
dark-coloured. *Tetraspores* dispersed through the surface-cells of the
lets, on different plants. *Colour* a delicate rosy-red, becoming dar
drying, and sometimes changing to brownish-red. *Substance* softly
branous, but not gelatinous. In drying, the frond shrinks and a
pretty closely to paper.

In a recent number (Plate CXCIX) I figured a dou
member of the genus *Rhodophyllis;* the plant now given
be taken as a *typical* representative. The structure of the
tocarp, when nearly ripe, in all genuine species of the g
is remarkable, and a vertical section (Fig. 3) is a beautiful
croscopic object, from the strings of ruby-like cells lying
matrix of clear gelatine, through which an irregular dehis
takes place eventually. The *tetraspores* are generally of
size, lying apart, and their zoned character is readily seen,
without dissection.

In most species of *Rhodophyllis,* the cystocarps are marg
here they are scattered irregularly over the surface, by which
racter this plant may always be known from the smaller forn
R. membranacea, some of which resemble it in ramification.

Fig. 1. Rhodophyllis volans. 2. Another specimen, in fruit:—both o
natural size. 3. Section through a conceptacle. 4. Section of the f
5. Portion of the surface of the frond, with scattered tetraspores. 6.
tetraspores, removed:—*magnified.*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Ser. Rhodospermeæ. Fam. *Sphærococcoideæ.*

Plate CCXVII.

SARCOCLADIA OBESA, *Harv.*

Gen. Char. *Frond* flat, firmly fleshy, thick, multifid, composed of two strata; the *medullary* stratum sponge-like, formed of short, anastomosing cellules, and larger, roundish, granuliferous cells; the *cortical* of minute, vertically seriated cellules. *Fructification:* 1, marginal, hemispherical, umbilicated conceptacles, containing under a thick pericarp, minute, seriated spores, radiating from a central placenta; 2, *tetraspores?*—Sarcocladia, from σαρξ, *flesh*, and κλαδος, *a branch.*

Frons plana, cartilagineo-carnosa, crassa, multifida, duplici strato constituta; stratum medullare cribroso-spongiosum, e cellulis brevibus anastomosantibus et cellulis majoribus lacunosis granuliferis, corticale e cellulis minutis verticaliter seriatis formatum. Fructus: 1, *cystocarpia marginalia, elevata, hemispherica, umbilicata, intra pericarpium carnosum sporas minutas in filis e placenta centrali radiantibus seriatas foventia; tetrasporæ . . . ?*

Sarcocladia *obesa,* Harv.

Sarcocladia obesa, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 550; *Alg. Austr. Exsic. n.* 326.

Hab. Cast ashore at King George's Sound and Rottnest Island, *W. H. H.* and *G. Clifton.*

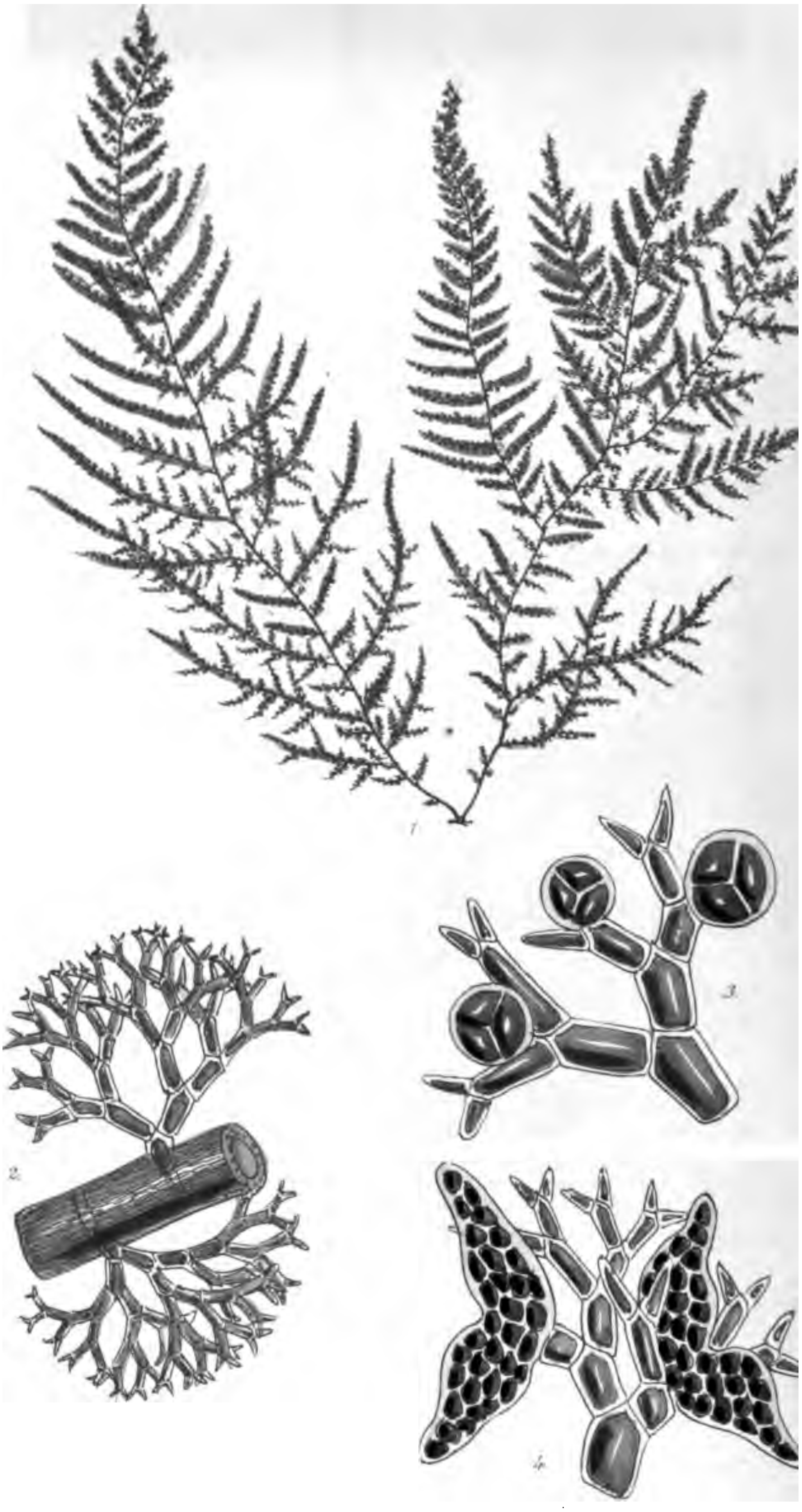
Geogr. Distr. West and south-west coasts of Australia.

Descr. *Root* an expanded, fleshy disc, an inch or more in diameter. *Fronds* 6–8 inches long, and as much in the expansion of the divisions, thick and fleshy, irregularly multifid; *laciniæ* linear, flattish, slightly convex on the upper, concave on the lower surface, with subreflexed margins, irregularly branched, sometimes digitate, sometimes secundly incised, the divisions wavy, spreading, obtuse. Some specimens are much more decompound than others. *Conceptacles* marginal, several together, depressed-spherical, constricted at base, deeply umbilicate at the apex, and at length pierced by a pore; the *pericarp* very thick; the *placenta* globose, and nearly filling the cavity; *spores* minute. The *colour* is a very dark brownish-purple, becoming brown, or almost black, in drying. The *substance* is firmly fleshy, becoming rigid or horn-like when dry. The plant does not adhere to paper.

A clumsy-looking Alga, not distantly related both to *Gracilaria,* from which it differs in habit, and to *Curdiæa,* with which it more nearly agrees; but until the tetraspores shall have been observed, it will be difficult to say next to which of these genera it should be placed. With a general agreement among the three in structure, there is in the constitution of the medullary stratum of *Sarcocladia* something peculiar, namely, the isolation of the graniferous cells one from another, and the interposition of the anastomosing empty cells. This structure, if correctly described, ought to be sufficient to separate the present plant from *Curdiæa*.

Though common enough in Western Australia, it has not yet been sent from any other part of the coast. It is not a plant likely, by its beauty, to attract any but a botanist.

Fig. 1. SARCOCLADIA OBESA,—*the natural size.* 2. Partial section, showing medullary and peripheric strata. 3. Conceptacles. 4. Vertical section through a conceptacle:—more or less *magnified*.



Vincent Brooks

PLATE CCXVIII.

CALLITHAMNION LARICINUM, *Harv.*

GEN. CHAR. *Frond* filiform, branched, articulated, monosiphonous, the stem and branches (in many species) at length thickened internally, or coated externally with decurrent filaments; ramuli always pellucidly articulate and monosiphonous. *Fructification:* 1, *favellæ* generally in pairs, axillary or sessile on the branches, naked, containing numerous angular spores; 2, *tetraspores* naked, sessile or pedicellate, distributed on the ramuli, generally triangularly parted.—CALLITHAMNION (*Lyngb.*), from *καλλις, beautiful,* and *θαμνιον, a little shrub.*

Frons filiformis, ramosa, articulata, monosiphonia, caule ramisque majoribus (in pluribus), demum fibris decurrentibus interne vel externe evolutis corticatis v. firmatis; ramulis semper pellucide articulatis. Fruct.: 1, *favellæ binatæ, axillares v. ad ramos sessiles, nudæ, sporas numerosas angulatas foventes;* 2, *tetrasporæ nudæ, ad ramulos sessiles v. pedicellatæ, triangule v. cruciatim divisæ.*

CALLITHAMNION *laricinum;* frond cartilaginous, setaceous (1–8 inches high), opaque nearly to the ends of the branches, pyramidal in outline, branched toward every side; branches alternate, patent, gradually shorter upwards, everywhere beset with dichotomo-multifid ramuli; ramuli several times forked, the segments spreading, the tips very short and spine-like; favellæ in pairs, oblong, simple or forked; tetraspores globose, scattered on the sides of the branchlets.

C. laricinum; *fronde cartilaginea setacea (*1–8-*unciali) fere ad apices ramorum corticata glabra quoquoversum ramosa ambitu pyramidali; ramis alternis patentibus superne sensim brevioribus, ramulis dichotomo-multifidis undique obsessis, ramulorum segmentis patentibus ultimis brevissimis spinæformibus; favellis geminis oblongis simplicibus v. furcatis; tetrasporis globosis ad latera ramulorum sparsis.*

CALLITHAMNION laricinum, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 562; *Alg. Austr. Exsic. n.* 510. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 335.

HAB. On *Zostera,* at Rottnest, *W. H. H.* Garden Island, *G. Clifton.* Port Fairy, *W. H. H.* Warnambool, *H. Watts.* Port Arthur, Tasmania, *W. H. H.*

GEOGR. DISTR. West and south coasts of Australia. Tasmania.

DESCR. *Root* a small disc. *Fronds* subsolitary, setaceous or ultra-setaceous, from 2–8 inches high, with an undivided leading stem closely set with lateral, alternate, virgate branches, which are either simple or pinnate; the general frond therefore is either simply or doubly, sometimes triply, pinnate. Both the stem and all the larger and lesser branches are coated with cellules throughout, no articulation being externally visible except near the extremities and on the very young branches; the surface of the larger branches is smooth. All the young and smaller branches are closely set with minute, alternate, many times dichotomous, fastigiate, pellucidly articulate ramuli, which are ½–1 line in length. *Articulations* of the ramuli 5–3 times as long as broad; apices spreading, obtuse. *Favellæ* on the ramuli, generally consisting of two divergent lobes, ovate-oblong or acuminate. *Tetraspores* globose, lateral or axillary on the forks of the ramuli, sessile. *Colour* a deep brownish-purple, becoming darker and browner in drying; the younger ones redder. *Substance* in the young plant very soft; in the older firm, not gelatinous. In drying it closely adheres to paper.

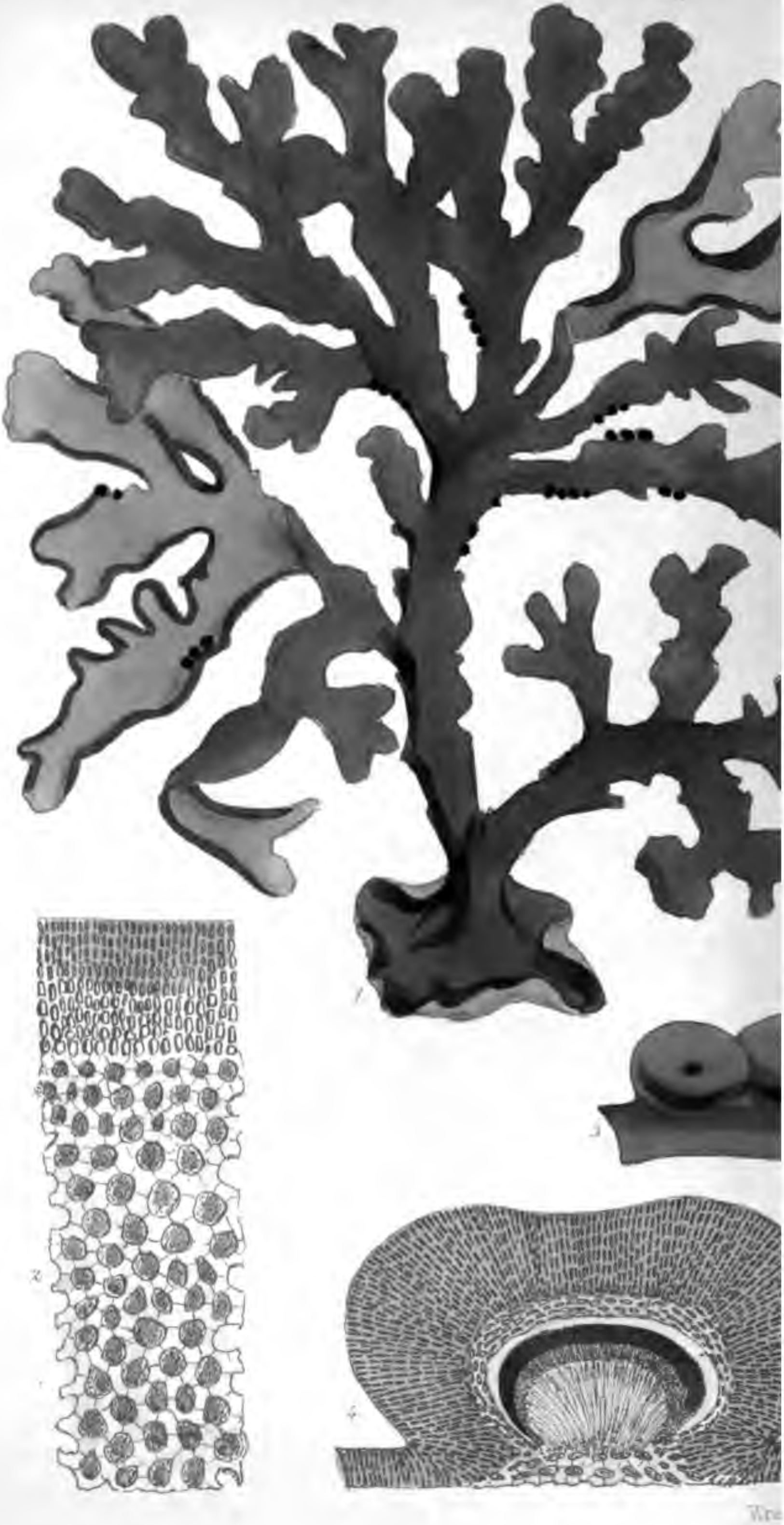
This pretty species has, in its general contour, a great resemblance to the European *Callithamnion tetragonum*, but in its microscopic characters it comes much nearer to *C. grande*, in the section distinguished by dichotomous ramuli and scattered tetraspores. From all known species, however, it is sufficiently distinct in ramification and matters of detail. The form of the *favellæ* is very unusual, and, if constant, as it seems to be, affords an additional mark by which the species may be known.

The specific name *laricinum* was chosen, not so much in reference to any resemblance to a Larch as to the Moss called *Hypnum laricinum*, to which, in ramification, this Alga bears some likeness.

There is a marked difference in luxuriance between specimens from different localities: those from Port Fairy, from which our figure is drawn, are greatly larger than those from Rottnest Island, on which the species was founded.

Fig. 1. CALLITHAMNION LARICINUM,—*the natural size*. 2. Portion of a branch, with dichotomous ramuli. 3. Apex of a ramulus, bearing *tetraspores;* apex bearing *favellæ:—magnified.*

Plate



Vin

PLATE CCXVII.

SARCOCLADIA OBESA, *Harv.*

GEN. CHAR. *Frond* flat, firmly fleshy, thick, multifid, composed of two strata; the *medullary* stratum sponge-like, formed of short, anastomosing cellules, and larger, roundish, granuliferous cells; the *cortical* of minute, vertically seriated cellules. *Fructification:* 1, marginal, hemispherical, umbilicated conceptacles, containing under a thick pericarp, minute, seriated spores, radiating from a central placenta; 2, *tetraspores?*—SARCOCLADIA, from σαρξ, *flesh,* and κλαδος, *a branch.*

Frons plana, cartilagineo-carnosa, crassa, multifida, duplici strato constituta; stratum medullare cribroso-spongiosum, e cellulis brevibus anastomosantibus et cellulis majoribus lacunosis granuliferis, corticale e cellulis minutis verticaliter seriatis formatum. Fructus: 1, *cystocarpia marginalia, elevata, hemispherica, umbilicata, intra pericarpium carnosum sporas minutas in filis e placenta centrali radiantibus seriatas foventia; tetrasporæ . . . ?*

SARCOCLADIA *obesa,* Harv.

SARCOCLADIA obesa, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 550; *Alg. Austr. Exsic. n.* 326.

HAB. Cast ashore at King George's Sound and Rottnest Island, *W. H. H.* and *G. Clifton.*

GEOGR. DISTR. West and south-west coasts of Australia.

DESCR. *Root* an expanded, fleshy disc, an inch or more in diameter. *Fronds* 6–8 inches long, and as much in the expansion of the divisions, thick and fleshy, irregularly multifid; *laciniæ* linear, flattish, slightly convex on the upper, concave on the lower surface, with subreflexed margins, irregularly branched, sometimes digitate, sometimes secundly incised, the divisions wavy, spreading, obtuse. Some specimens are much more decompound than others. *Conceptacles* marginal, several together, depressed-spherical, constricted at base, deeply umbilicate at the apex, and at length pierced by a pore; the *pericarp* very thick; the *placenta* globose, and nearly filling the cavity; *spores* minute. The *colour* is a very dark brownish-purple, becoming brown, or almost black, in drying. The *substance* is firmly fleshy, becoming rigid or horn-like when dry. The plant does not adhere to paper.

A clumsy-looking Alga, not distantly related both to *Gracilaria,* from which it differs in habit, and to *Curdiæa,* with which it more nearly agrees; but until the tetraspores shall have been

The *substance* is leathery when fresh, rigid and rather brittle when dry, in which state the frond does not adhere to paper.

At Plate XXIV. we have figured a broad-leaved species of *Myriodesma*, with which our present plant, for which the genus was founded, may be contrasted. Besides the narrow lamina, which in itself would be hardly sufficient to mark a species, *M. serrulata* is known from *M. latifolia* by the single series of spore-cavities at each side of the midrib. In other respects, except in size, the two nearly agree.

M. serrulata, though long known, appears to be rather a rare species; unless indeed, as sometimes happens, it is often neglected by collectors. I may here be allowed to express my regret, that few of my obliging correspondents in the Colonies are careful to seek out and preserve the brown or *fucoid* Algæ sufficiently.

Fig. 1. MYRIODESMA SERRULATA, *the natural size*. 2. Portion of a serrated lacinia, showing the spore-cavities. 3. Section through two spore-cavities (empty) :—*magnified*.

Plate [illegible]

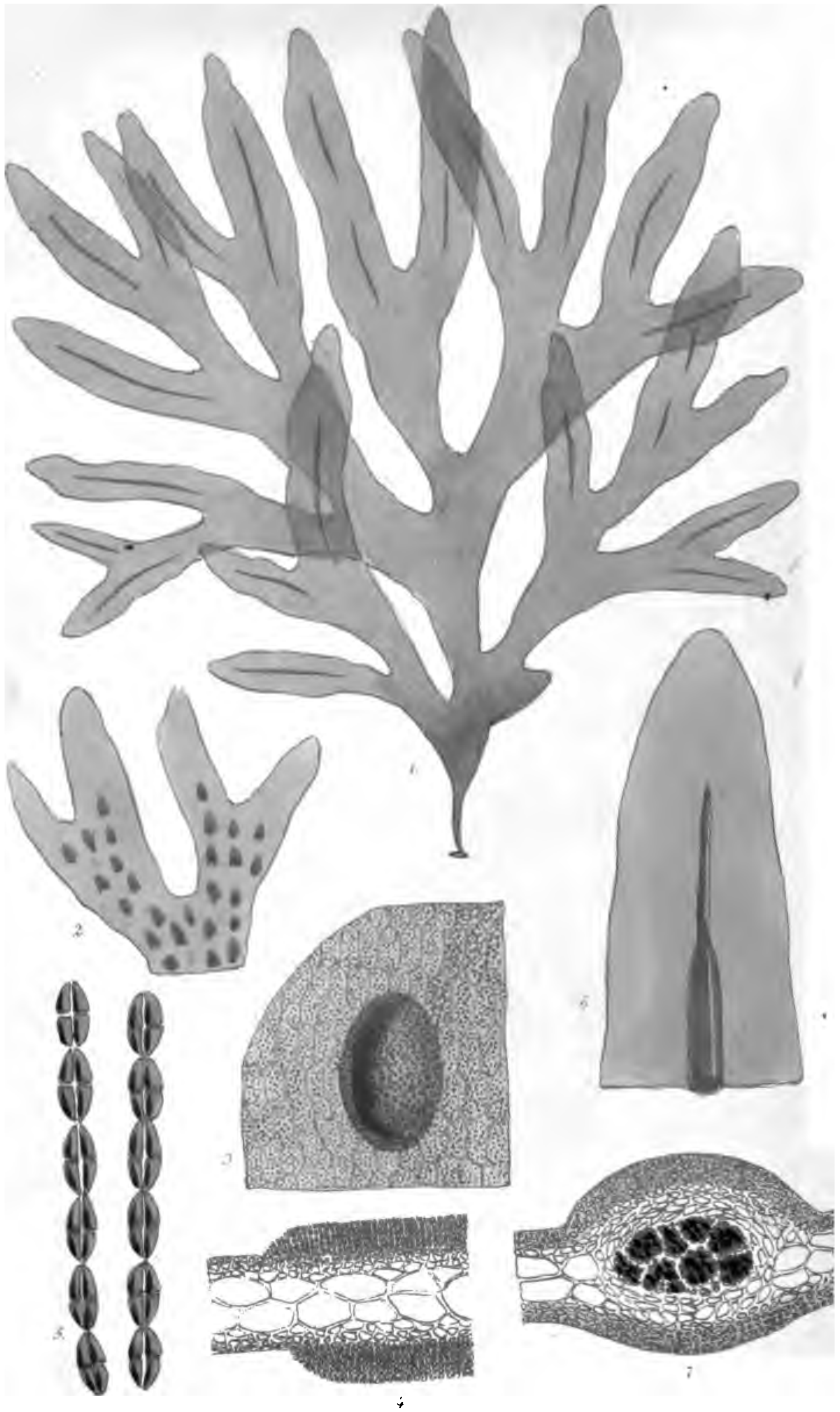


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PLATE CCXX.

STENOGRAMME INTERRUPTA, *Mont.*

GEN. CHAR. *Frond* rose-red, membranous, flat, nerveless, laciniate, composed of two strata of cells; the *medullary* stratum of roundish-angular cells, in several rows; the *cortical* of minute, coloured cellules. *Fructification:* 1, linear, nerve-like conceptacles, containing within a thick pericarp confluent masses of minute spores; 2, superficial, convex *nemathecia,* formed of strings of cruciate tetraspores.—STENOGRAMME (*Harv.*), from *στενος, narrow,* and *γραμμη, a line,* alluding to the linear fructification.

Frons rosea, membranacea, plana, enervis, laciniata, stratis duobus composita; strato medullari ex cellulis magnis rotundato-angulatis pluribus seriebus dispositis, corticali ex cellulis minimis coloratis conflato. Fruct.: 1, *cystocarpia linearia, nerviformia, intra pericarpium crassum sporas minimas congregatas foventia;* 2, *nemathecia externa, convexa, in fila moniliformia tetrasporarum cruciatarum evoluta.*

STENOGRAMME interrupta, *Mont. in Duchart. Rev. Bot.* 1846, *p.* 483. *Harv. Phyc. Brit. t.* 157. *J. Ag. Sp. Alg. v.* 2. *p.* 391. *Kütz. Sp. Alg. p.* 873. *Harv. in Hook. Fl. N. Zeal. v.* 2. *p.* 249; *Ner. Bor. Amer. v.* 2. *p.* 163. *t.* 19 C. *Hook. Fl. Tasm. v.* 2. *p.* 319.

STENOGRAMME Europæa, *Harv. in Herb.* 1847.

STENOGRAMME Californica, *Harv. Bot. Beechey, p.* 408. *Kütz. Sp. p.* 874. *J. Ag. Sp. Alg. v.* 2. *p.* 392.

DELESSERIA interrupta, *Ag. Sp. Alg. v.* 1. *p.* 179; *Syst. p.* 250. *Mont. in Webb, Ot. Hisp. p.* 15. *t.* 8. *Endl.* 3*rd Suppl. p.* 53.

HAB. Georgetown and Port Arthur, Tasmania, *W. H. H.*

GEOGR. DISTR. Tasmania. New Zealand. California. Florida. Coasts of Spain. Mediterranean shores of France. Plymouth Sound and north Devon, England. Cork Harbour and Strangford Lough, Ireland.

DESCR. *Root* a small disk. *Frond* flabelliform, 6–12 inches long and broad, rising from a small filiform stem, which rapidly passes into a cuneate membrane; this membrane further expands, then forks, and afterwards is repeatedly but irregularly dichotomous. The *laciniæ* are ¼–½ inch broad, linear, spreading, with blunt apices and axils. There is no proper midrib; but in specimens which produce conceptacles there runs through the centre of each lobe a raised and thickened line, of greater or less length; this is afterwards changed into a linear, sausage-shaped conceptacle, containing conglobated masses of minute spores; these *conceptacles* are sometimes two inches long. *Nemathecia* (on different individuals) thickly scattered, as wart-like blotches,

over both surfaces, prominent, roundish or oval, consisting at first of slende vertical filaments, which are changed finally into strings of cruciate *tetraspores*. *Colour* a bright, pinky-red, preserved in drying. *Substance* membranous, rigid when dry. In drying it imperfectly adheres to paper.

A strongly marked and not very variable Alga, and peculiarl interesting on account of the wide geographical limits over whic it ranges. It was first noticed on the Atlantic coasts of the sout of Spain, next in California, and within recent years has bee brought from the various remote and widely separated station above enumerated. The warmer temperate zones of the Atlanti and Pacific, north and south, are its home. The most luxurian specimens seen, of the largest size and brightest colour, com from New Zealand, where it seems to be of frequent occurrence In Australia it is comparatively rare. The locality Strangford Lough, north of Ireland, now first recorded in print, was ascertained by Professor Dickie, of Aberdeen (late of Belfast), who found it growing on small, loose stones (its favourite habitat), in one particular part of the harbour: this is the most northern o the known stations, as New Zealand is the most southern.

Fig. 1. STENOGRAMME INTERRUPTA, with linear *conceptacles*. 2. Fragmen with *sori* of tetraspores:—both the *natural size*. 3. A small portion of th frond, with a *sorus*. 4. Section through frond and sorus. 5. Strings o *tetraspores*. 6. Portion of frond and conceptacle. 7. Section through frond and conceptacle:—variously *magnified*.

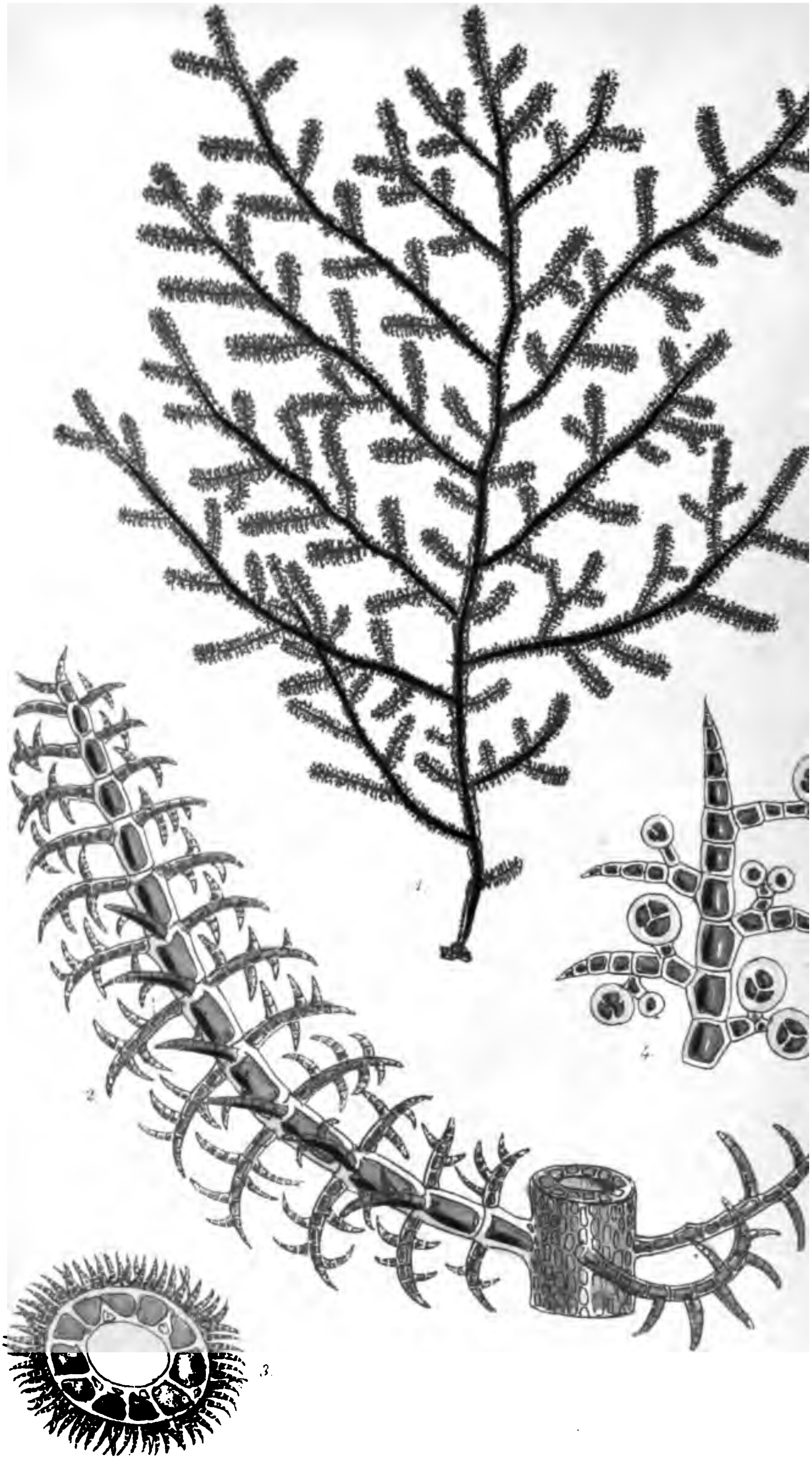

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Plate CCXXI.

PTILOTA? HANNAFORDI, *Harv.*

Gen. Char. *Frond* compressed or two-edged, distichous, pectinato-pinnate, inarticulate, with an articulate monosiphonous axis; the pinnules sometimes articulate. *Fructification:* 1, involucrate *favellæ*, containing numerous angular spores; 2, *tetraspores* attached to the pinnules, sessile or stalked, solitary or glomerulate, tripartite.—Ptilota (*Ag.*), from πτιλωτος, *pinnated.*

Frons compressa v. anceps, disticha, pectinato-pinnata, corticata, axi articulato monosiphonio percursa; pinnulis sæpius corticatis, nunc pellucide articulatis. Fruct.: 1, *favellæ involucratæ sporas numerosas angulatas foventes;* 2, *tetrasporæ ad pinnulas sessiles v. pedicellatæ, sparsæ v. glomerulatæ, triangule divisæ.*

Ptilota? *Hannafordi;* frond terete, velvety, irregularly bipinnately branched; branches unequal, alternate, closely set with minute, squarrose, subbipinnate pinnæ; pinnæ articulate, alternate, opposed by 1–2 small ramuli, distichously or 3–4-stichously bipinnate, the ultimate pinnules subulate and recurved, articulate; tetraspores globose, subsessile on the ultimate pinnules.

P. Hannafordi; *fronde tereti velutina vage bipinnatim ramosa; ramis inæqualibus alternis pinnis minimis squarrosis creberrime onustis; pinnis articulatis alternis ramulis pusillis iis oppositis di-tri-tetrastiche bipinnatis, pinnulis subulatis recurvis articulatis, tetrasporis globosis ad latera pinnularum subsessilibus.*

Wrangelia? squarrulosa, *Harv. Alg. Austr. Exsic. n.* 266.

Hab. Port Fairy, *W. H. H.*, 1855. Lady Bay, *Mr. Hannaford*, 1857. Warnambool, *H. Watts*, 1859 (*n.* 26).

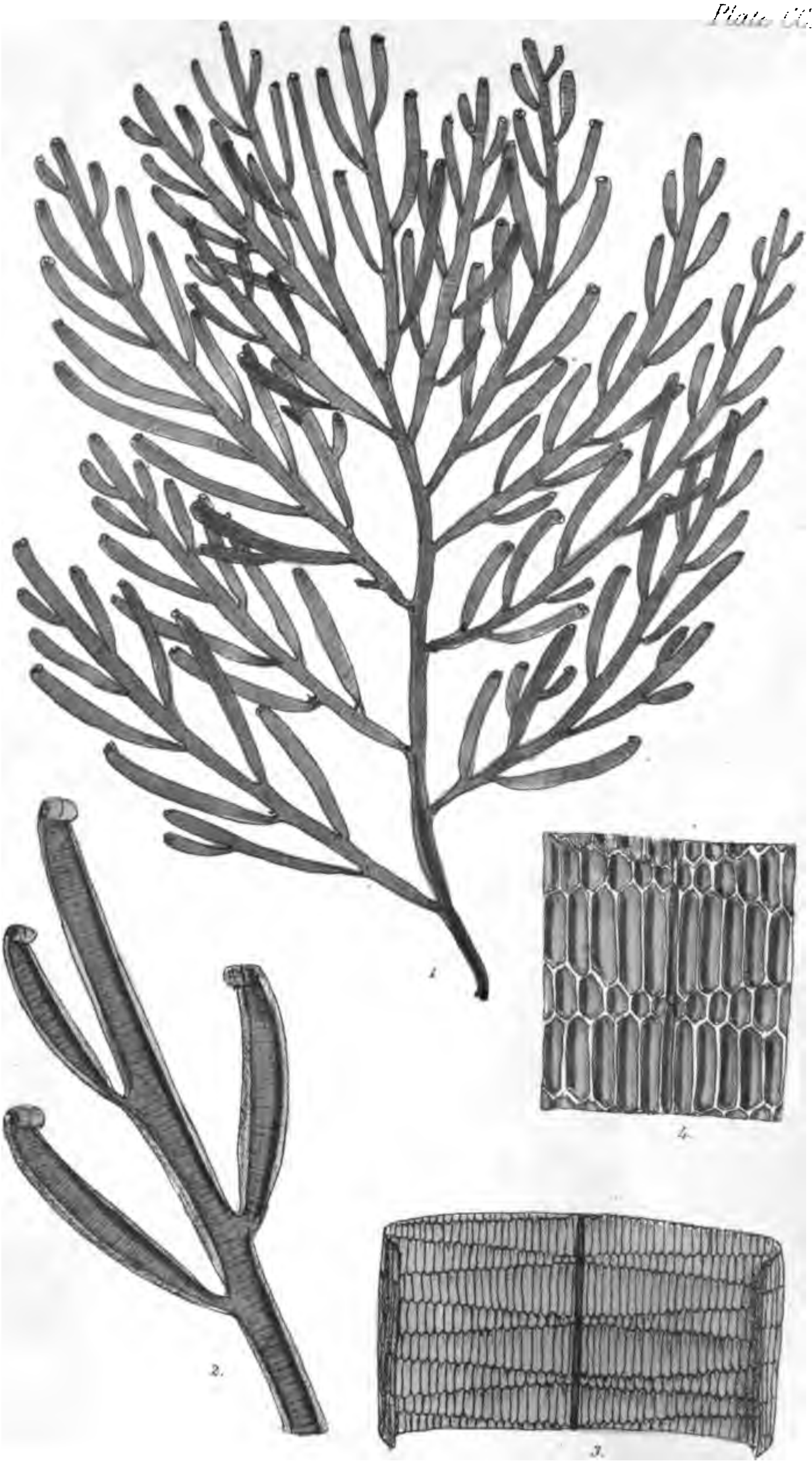
Geogr. Distr. South coast of Australia. Rare.

Descr. *Root* a disc. *Frond* 4–8 inches high, 3–4 in the expansion of the branches, having a percurrent stem and distichous, lateral, unequal, spreading or horizontal, simple or laxly-pinnated branches. The *stem* and all the larger and older *branches* are covered with a velvet-like pile of minute jointed hairs; only the younger branches are glabrous. At first the whole frond, and afterwards the branches only, are densely set with minute pinnæ 1–1½ lines long and closely placed, alternating with each other, and each opposed to 2–3 minute abortive pinnæ or branchlets. The *pinnæ* are articulated and oppositely bipinnate, or whorled with ternate or quaternate pinnules; the pinnules are patent or recurved, and sharp-pointed. All the *articulations* are short. *Favellæ* unknown. *Tetraspores* globose, on very short pedicels, lateral on the ultimate pinnules, ternately partite. *Colour* a dark brownish or full red, preserved or deepened in drying. The *substance* is firm and cartilaginous, and in drying the frond does not adhere to paper.

A very rare and strongly-marked species, but one whose *genus* cannot be correctly determined until the *cystocarps* shall be found. I have hesitated whether to place it in *Wrangelia*, *Ballia*, *Callithamnion*, or *Ptilota*; and in choosing the latter genus for its temporary location, I am guided more by general habit than by distinctive characters.

Though a very rare species, it has been found in three localities, first by myself, and more recently by two valued correspondents. In naming it after one of my friends, I record the fact, that it was from him that I received, though not the earliest found, yet by much the most perfect specimen, and that from which the drawing has been taken. I wish, too, here to express to Mr. Hannaford my thanks for several small parcels of Algæ sent to me at different times.

Fig. 1. PTILOTA HANNAFORDI,—*the natural size.* 2. A pinna, with its opposing abortive pinnæ. 3. Section through the stem. 4. Pinnule, bearing tetraspores:—*variously magnified.*



Vincent Brooks, Imp.

PLATE CCXXII.

AMANSIA PINNATIFIDA, *Harv.*

EN. CHAR. *Frond* flat, midribbed, pinnatifid or proliferous, transversely striate, membranaceous; the membrane formed of hexagonal cells, of equal length, arranged in obliquely transverse lines or striæ, destitute of cortical cellules. *Fructification:* 1, ovate or globose *ceramidia,* containing a tuft of pear-shaped spores; 2, simple or branched, marginal or superficial *stichidia,* containing *tetraspores* in a double row. —AMANSIA (*Lamour.*), in honour of M. Amans, a French phycologist.

Frons plana, costata, pinnatifida v. prolifera, transversim striata, membranacea; lamina ex cellulis oblongis hexahedris æqualibus oblique transversim ordinatis conflata; cellulis corticalibus nullis. Fruct.: 1, *ceramidia;* 2, *stichidia marginalia v. superficialia, tetrasporas biseriatas foventia.*

MANSIA *pinnatifida;* frond alternately bi-tripinnatifid, pinnæ and pinnules linear, constricted at base, inrolled at apex, with a very slender, monosiphonous, articulate midrib; areolations linear-oblong, hexagonal, in transverse zones, alternately those of one zone shortening, those of the following zone lengthening from the midrib to the margin; fruit unknown.

A. pinnatifida; *fronde alterne bi-tripinnatifida; laciniis lacinulisque linearibus basi constrictis apice involutis costa tenuissima monosiphonia articulata percursis; areolis lineari-oblongis hexagonis transversim zonatis, iis alterius zonæ, e costa ad marginem gradatim alterne brevioribus et longioribus; fructu ignoto.*

AMANSIA pinnatifida, *Harv. Alg. Austr. Exsic. n.* 119.

AB. King George's Sound, always infested by *Membranipora delicatissima,* Bsk., common, *W. H. H.*

OGR. DISTR. South-west of Australia.

SCR. *Fruit* a small disc. *Frond* 6–8 inches long, and as much in the expansion of the branches, linear in every part, from 1 to 1½ lines wide, several times distichously pinnatifid. *Branches* alternate or secund, their pinnæ and pinnules 2–4 lines asunder, erecto-patent, narrowed at base, with inflexed margins and inrolled obtuse apices, traversed by a very slender, unicellular, articulated midrib. The *membrane* is composed of a single plate of elongated, hexagonal, longitudinal cellules, arranged in zones transversely across the lamina; these zones are alternately different, the *cells* in one zone diminishing in length from the costa to the margin, those in the other diminishing from the margin to the costa. No *fruit* has yet been observed. The *colour* is a deep purplish brown-red, growing darker drying. The *substance* is firmly membranous and rigid, but thin, a in drying the frond does not adhere to paper.

A well marked species of *Amansia*, with a cellular arrang ment, quite unlike that of any other Alga with which I a acquainted. In others of the genus, the cells in each successi longitudinal row are similar in length and breadth; but hei we have first a band of cells proceeding from midrib to margi with the *longest* cell next the midrib, and the rest gradual *shorter* to the margin; and following it, we have a band of ce commencing at the midrib, with a very *short* cell, and the re gradually *longer* towards the margin. No fruit has yet be seen, but the genus can hardly be considered doubtful on th account.

Of the many specimens found, *every* one was complete covered on the under surface by a species of *Membranipoi* which, on being submitted to Mr. Busk, received from him t following name and character:—

M. DELICATISSIMA (Busk); *inermis, cellulis oblongis seu subpyriformil membranaceis, margine tenui lævi, orificio semiorbiculari, labio inferi prominente.* Busk, in litt.

Fig. 1.—AMANSIA PINNATIFIDA,—*the natural size.* 2. Small portion of frond, showing inflexed margin and involute apices. 3. Fragment of same, to show the arrangement of the cellular tissue. 4. Some of seriated cellules:—*variously magnified.*

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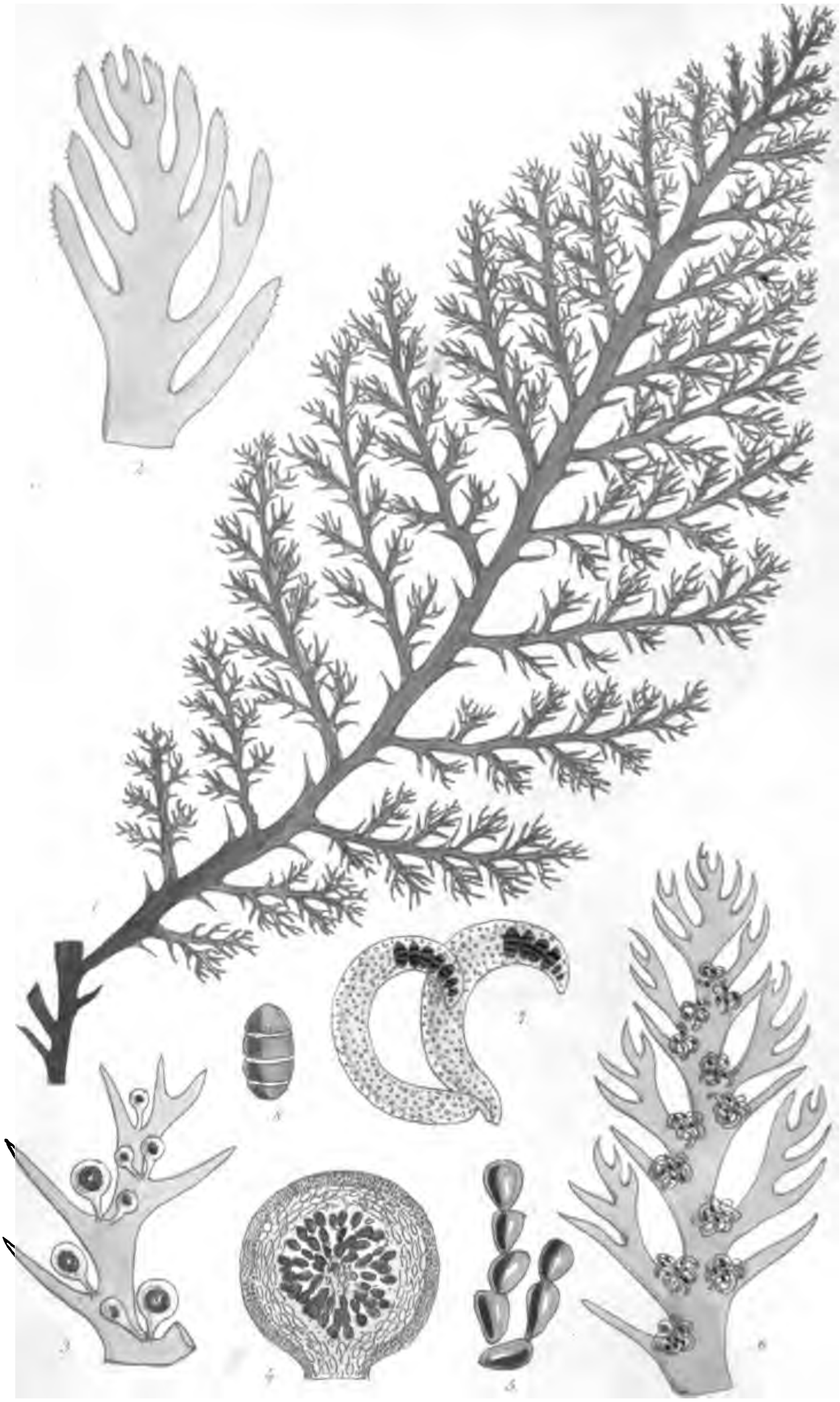

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Plate CCXXIII.

PLOCAMIUM PROCERUM, *J. Ag.*

Gen. Char. *Frond* membranaceo-cartilaginous, linear, plano-compressed, pinnately decompound; the pinnules alternately secund, in pairs or in threes or fours; composed of two strata of cells; the inner cells oblong, longitudinal; the outer polygonal, coloured, small. *Fructification:* 1, *conceptacles* sessile or pedicellate, hemispherical, with a cellular pericarp finally opening by a pore; sporiferous filaments numerous, radiating in several tufts from a basal placenta; 2, *tetraspores* lodged in proper spore-leaves (*stichidia*), oblong, transversely zoned.—Plocamium (*Lyngb.*), from πλοκαμος, *a tuft of hair.*

Frons membranaceo-cartilaginea, linearis, plano-compressa, pinnatim composita, pinnis alterne geminis ternis quaternisve, duplici strato contexto; cellulis interioribus majoribus oblongis longitudinalibus, superficialibus coloratis minutis polygonis. Fruct.: 1, *cystocarpia sessilia v. pedicellata, hemisphærica, pericarpio celluloso demum carpostomio munita, fila sporigera fasciculata a placenta basali radiantia foventia;* 2, *tetrasporæ zonatim divisæ, in sporophyllis propriis nidulantes.*

Plocamium *procerum;* frond linear, ribless or faintly ribbed, pectinato-pinnate; pinnæ alternately geminate, the lower one and the divisions of the upper from a broad base acuminate, subulate, entire or externally serrulate; conceptacles axillary, pedicellate, solitary or 2–4 together; stichidia axillary, tufted, simple, falcate or arched, acute.

P. procerum; *fronde lineari ecostata v. subtilissime costata pectinato-pinnata; pinnis alterne geminis, inferiori laciniisque superioris a basi latiore acuminatis subulatis integerrimis v. externe serrulatis; conceptaculis axillaribus pedicellatis subfasciculatis; stichidiis axillaribus fasciculatis simplicibus falcatis arcuatisve.*

Plocamium procerum, *J. Ag. Sp. Alg. v.* 2. *p.* 400. *Harv. in Hook. Lond. Journ. v.* 4. *p.* 542. *Ner. Austr. p.* 122. *Fl. N. Zeal. v.* 2. *p.* 246. *Fl. Tasm. v.* 2. *p.* 318. *Kütz. Sp. Alg. p.* 886.

Var. *β. Mertensii;* pinnæ and their divisions denticulate.

Var. *β.* Mertensii; *pinnis pinnulisque denticulatis.*

Plocamium Mertensii, *Harv. Ner. Austr. p.* 122. *J. Ag. Sp. Alg. v.* 2. *p.* 401.

Thamnophora Mertensii, *Grev. Syn. p.* xlix. *J. Ag. in Linn. v.* 15. *p.* 10. *Sond. in Pl. Preiss. v.* 2. *p.* 193.

Thamnocarpus Mertensii, *Kütz. Sp. Alg. p.* 887.

Hab. Abundant on the west and south coasts of New Holland. Tasmania.

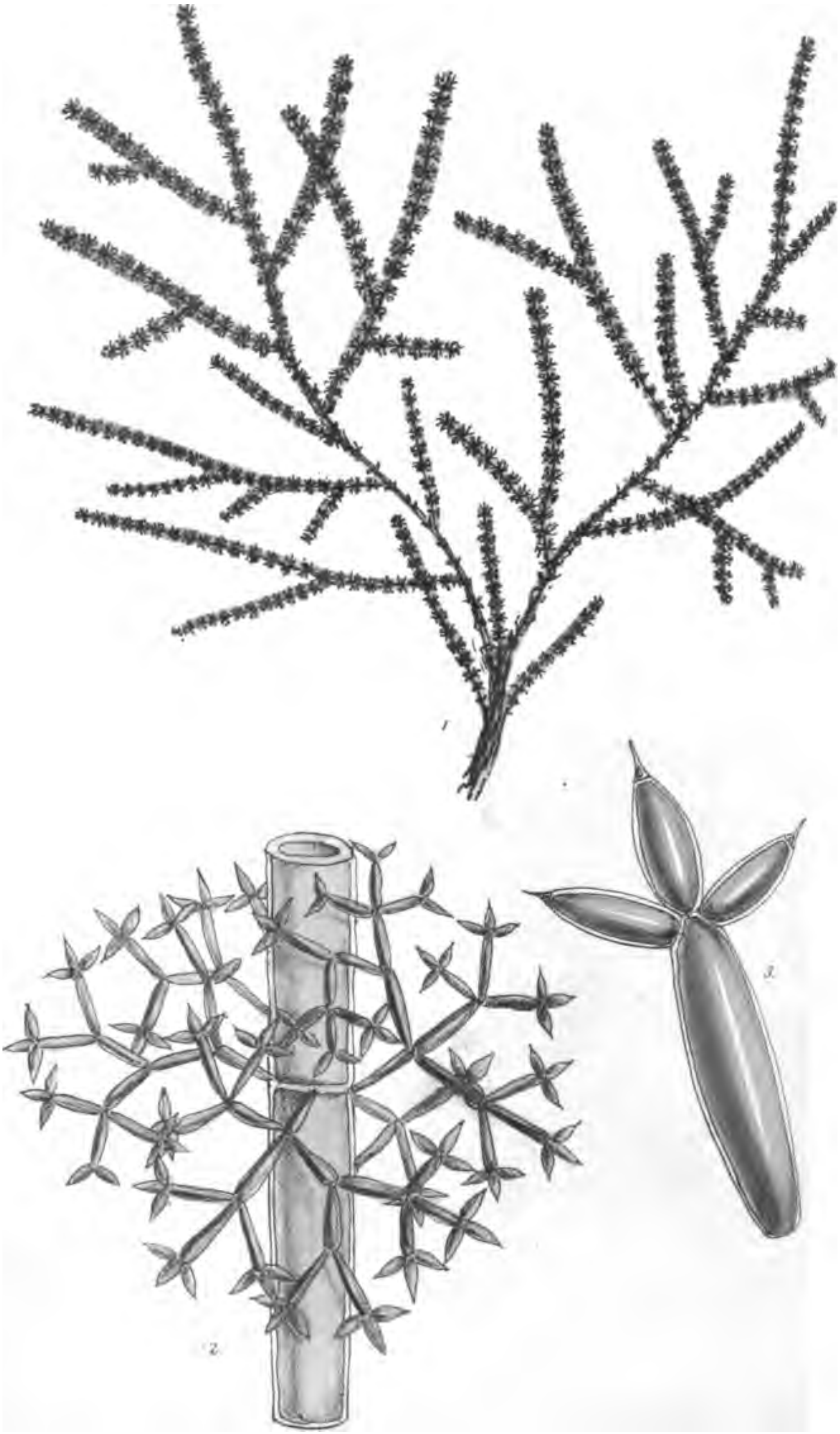
Geogr. Distr. New Holland. Tasmania. New Zealand.

Descr. *Root* branching. *Frond* 1–2 feet long or more, decompound-pinnate, 1–2–3 lines in diameter, thin, either wholly nerveless or with a very slender midrib; each principal branch narrowed to the base, virgate, 6–12 inches long, bi-tripinnate, lanceolate in outline, the middle pinnæ being the longest, the lower and upper gradually shorter towards base and apex. All the divisions of the frond are geminate, in alternate superposed pairs, the *lower* of each pair being simple and toothlike, the *upper* a pinnated or bipinnated branch or branchlet. The ultimate laciniæ are from a broad base subulate, either quite entire or more or less denticulate along the outer edge. In a not unfrequent abnormal condition, some or all of the pinnules towards the base of the branches are excessively divided dichotomously, their divisions capillary and interwoven, each pinnule resembling a little nest of branchlets. *Conceptacles* 1–2 together, axillary, stalked. *Stichidia* in dense axillary tufts, halfmoon-shaped. *Colour* a bright pinky-red. *Substance* soft and membranous. In drying it adheres more or less firmly to paper.

I venture, not without an attentive examination of a very large suite of specimens, to unite under one specific name the *Plocamium procerum*, J. Ag., and the *P. Mertensii*, Grev., forms which differ in no other respect save in the ultimate ramuli or pinnules. In the typical *P. procerum* these pinnules are quite entire, while in *P. Mertensii* they are finely toothed along the outer edge. Were this character constant, it might be sufficient, but it is far from being so. I find, on the contrary, that the little teeth are sometimes well marked and sometimes very faintly; and specimens, as might be expected, are not wanting, in which some of the pinnules are quite entire, and some denticulate, on the same or on different branches.

A variety commonly occurs, noticed in our detailed description, with dichotomo-multifid pinnules, sometimes general, and sometimes confined to the middle region of the specimen. This form probably grew in water deeper than that usually occupied by the species, as it is analogous to distortions which, in other Algæ, I have found prevalent among specimens from deep water.

Fig. 1. Branch of PLOCAMIUM PROCERUM, var. α,—*the natural size.* 2. Fragment of *P. procerum*, var. β *Mertensii*, showing the toothed margin of the lacinules. 3. Fragment of var. α, with *conceptacles.* 4. Section of a conceptacle. 5. Spore-strings. 6. Fragment of var. α, with *stichidia.* 7. Two of the stichidia. 8. A *tetraspore:—more or less magnified.*



Vincent Brooks Imp

PLATE CCXXIV.

WRANGELIA MYRIOPHYLLOIDES, *Harv.*

GEN. CHAR. *Frond* filiform, decompound, articulated, one-tubed; the *internodes* naked or coated with minute cellules; the *nodes* clothed with opposite or whorled articulated ramelli. *Fructification*: 1, *cystocarps* terminating short branches, involucrated by the uppermost whorled ramelli, and consisting of tufts of pear-shaped pedicellate *spores* and slender *paranemata*; 2, naked, triangularly parted *tetraspores*, borne on the sides of the whorled ramelli.—WRANGELIA (*Ag.*), in honour of Baron Wrangel, a Swedish naturalist.

Frons filiformis, decomposita, articulata, monosiphonia, nuda v. cellulis corticata, verticillis ramellorum ad genicula onusta. Fruct.: 1, *cystocarpia ramos terminantia, ramellis supremis involucrata, fasciculis numerosis sporarum pyriformium pedicellatarum et paranematibus tenuibus constantia;* 2, *tetrasporæ nudæ, triangule divisæ, ad ramellos sessiles.*

WRANGELIA *myriophylloides*; frond rigid, pellucidly articulate from the base, stupose below, pinnately branched; branches spreading, simple or once again pinnate, whorled with ramelli round the nodes; ramuli repeatedly trichotomous, the subdivisions spreading, three-forked at the point, apices very acute; fruit unknown.

W. myriophylloides; *fronde rigidiuscula e basi articulata ecorticata inferne stuposa pinnatim ramosa; ramis patentibus simplicibus v. iterum pinnatis ad genicula verticillatim ramellosis; ramellis pluries trichotomis, divisuris patentibus apice trifurcis acutissimis.*

WRANGELIA myriophylloides, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 546.

HAB. On the larger Fucoids at Rottnest, *W. H. H.*

GEOGR. DISTR. West Australia.

DESCR. *Root* fibrous, creeping epiphytically. *Fronds* intricate at base, 4–5 inches long, setaceous, rigid, pellucidly articulate throughout, sparingly branched; the branches subsimple, virgate, 1–2 inches long, occasionally with one or two secondary branches. Every node of the stem and branches is whorled with several-times trichotomous ramelli, their divisions very patent or horizontal, each one ending in three oval cells, tipped by a minute, acuminate, apical cellule. *Articulations* of the stem and branches many times longer than broad, cylindrical; those of the ramelli linear-oblong or elliptical, constricted at the nodes. *Fructification* unknown. *Colour* a pinky red, fading in fresh-water, and then turning brownish. *Substance* firm and rigid, not soon deliquescing. In drying the frond adheres, but not strongly, to paper.

Although the fruit of this species is at present unknown, I feel little hesitation in placing it in *Wrangelia*, rather than in *Griffithsia* or *Callithamnion*, the only two known genera with which it need be compared. The verticillate habit, the trichotomous ramuli, and the very acute points of the ultimate cellules, taken in conjunction with the substance and colour, all point to *Wrangelia*. Among known species, it comes nearest to *W. mucronata*, figured in 'Flora Tasmanica.'

Fig. 1. WRANGELIA MYRIOPHYLLOIDES,—*the natural size*. 2. Fragment, with whorled *ramelli*. 3. Apex of a ramellus:—*magnified*.

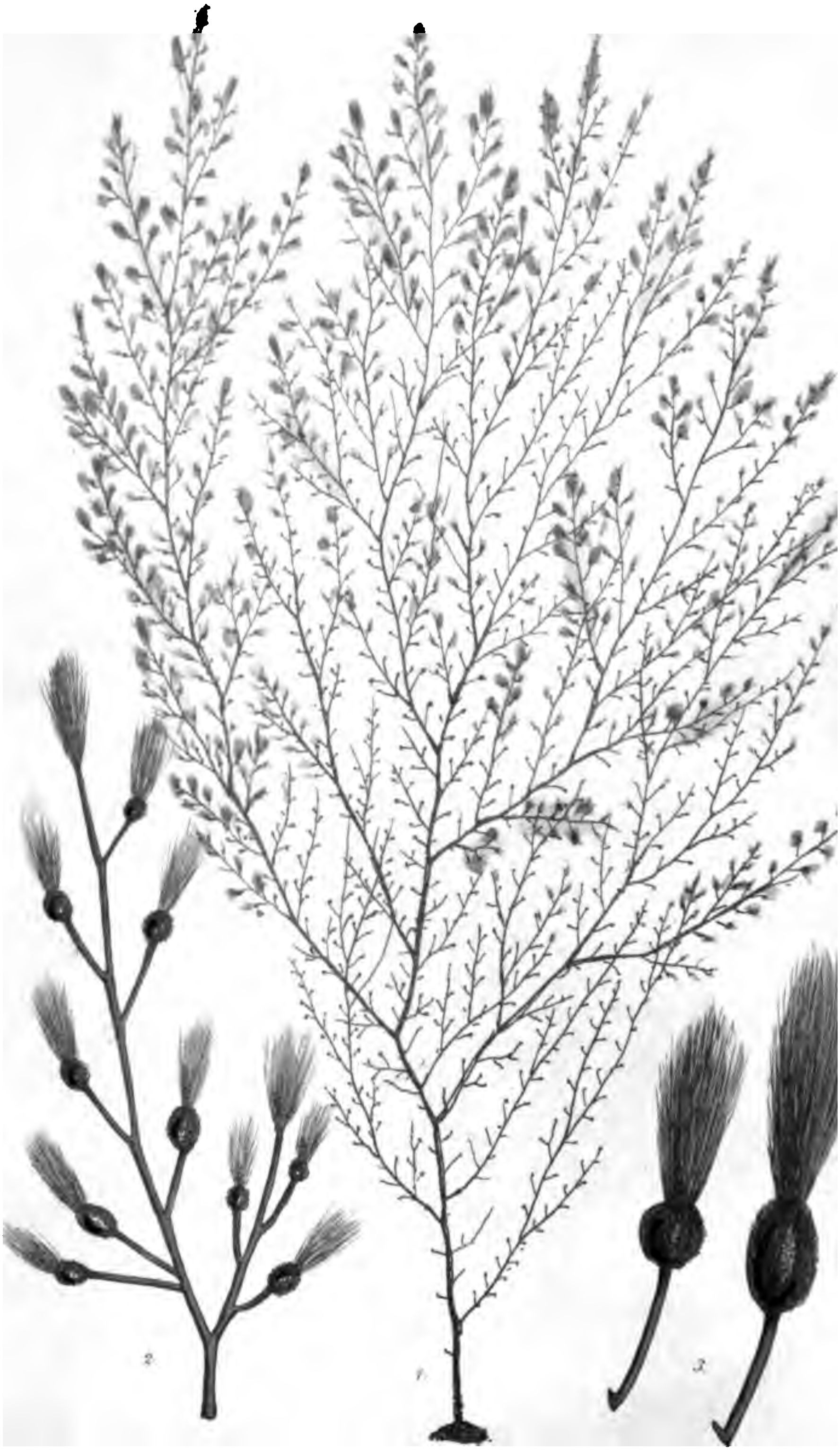

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Plate CCXXV.

SPOROCHNUS RADICIFORMIS, *Ag.*

Gen. Char. *Frond* filiform, solid, pinnately decompound. *Receptacles* pod-shaped, pedicellate (rarely sessile), crowned with a tuft of soft hairs, and densely covered with whorled, branching, sporiferous filaments. *Spores* obovoid, attached to the sides of the filaments.—Sporochnus (*Ag.*), from *σπορος*, *a seed*, and *χνοος*, *wool*, because tufts of soft hairs crown the fructification.

Frons filiformis, solida, pinnatim ramosa. Receptacula siliquæformia, pedicellata (rarissime sessilia), apice comosa, paranematibus ramosis horizontalibus verticellatis densissime vestita. Sporæ obovoideæ, ad paranemata laterales.

Sporochnus *radiciformis;* frond terete or compressed, rigid, slender, tree-like (1–2 feet high), glabrous; branches decompound, spreading every way, the smaller ones short and patent, alternate; receptacles spherical or oval, on pedicels much longer than themselves.

S. radiciformis; *fronde terete v. compressa rigida tenui dendroidea* (1-2-*pedali*) *glabra; ramis decompositis crebris undique egredientibus, minoribus brevibus patentibus alternis; receptaculis sphæricis aut ovalibus pedicellum ipsis multoties longius coronantibus.*

Sporochnus radiciformis, *Ag. Sp. Alg. v.* 1. *p.* 149; *Syst.* 258. *J. Ag. Sp. Alg. v.* 1. *p.* 175. *Kütz. Sp. Alg.* 568. *Harv. in Fl. Tasm. v.* 2. *p.* 287. *Alg. Exsic. Austr. n.* 48.

Fucus radiciformis, *R. Br. in Turn. Hist. t.* 189.

Hab. West and south coasts of New Holland. Tasmania. Not rare.

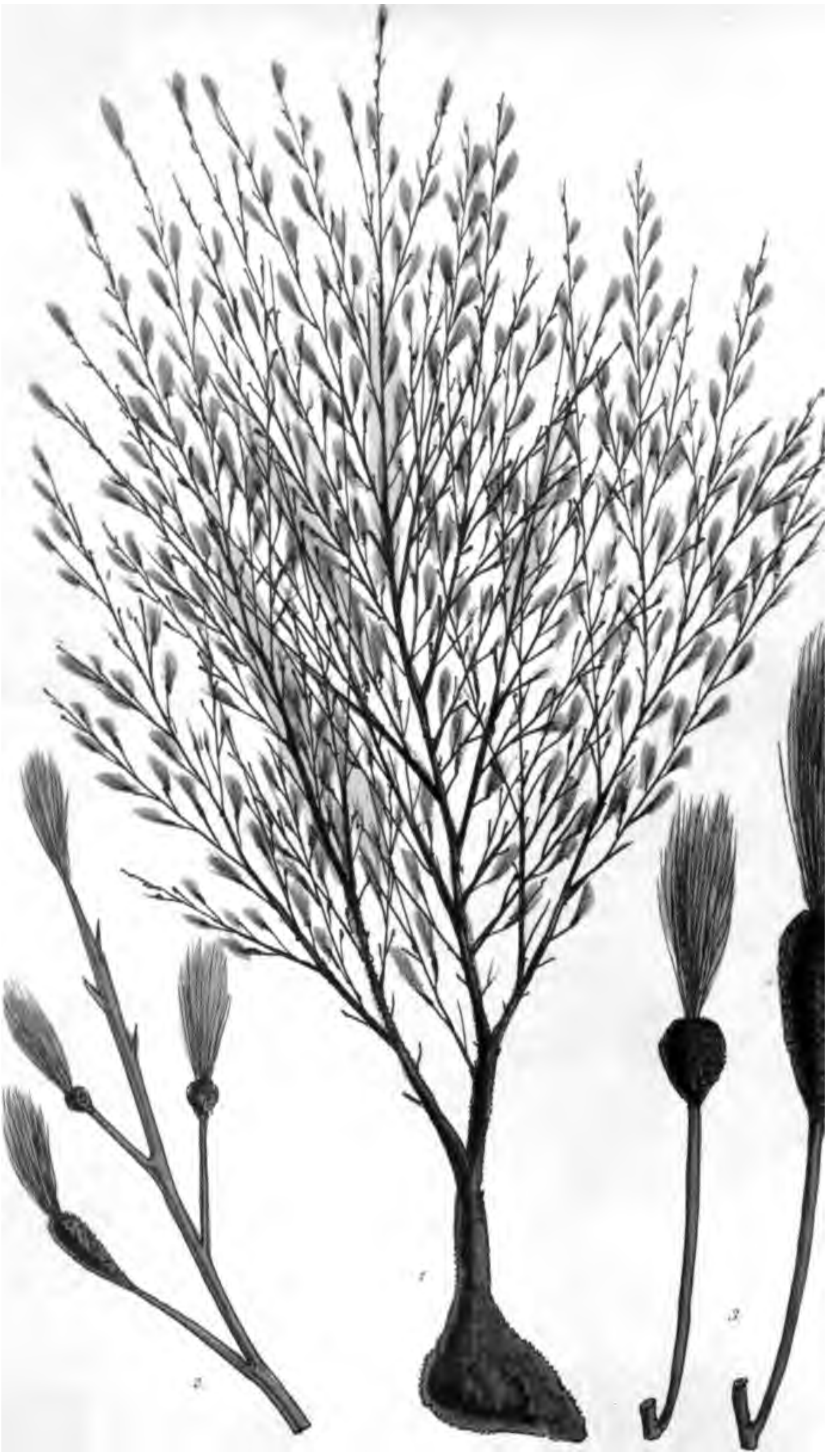
Geogr. Distr. West and south coasts of Australia. Tasmania.

Descr. *Root* a conical disc, coated with woolly fibres. *Frond* ultrasetaceous at base, becoming thinner upwards, 1–2 feet high, excessively branched and bushy, but slender; the branches mostly closely placed, several times decompound, and furnished with small spreading ramuli. Some specimens are much more decompound than others; those from deep estuaries, grown in rapid currents (as in the Tamar) have very long, slender, little divided branches, and proportionately long ramuli; those from the open sea are more bushy, less pinnated, with more zigzag ramification. *Receptacles* globose or oval, minute, on pedicels 1–3 lines long, the pedicel twice or thrice as long as the receptacle. The young frond bears tufts of capillary filaments on the ends of branches, branchlets, and receptacles. The *colour* is a brownish or greenish olive, becoming greener in fresh-water or the air. The substance when young is soft, that of the old frond somewhat rigid. In drying the frond adheres more or less firmly to paper.

This species is distributed along the whole of the south-weste and southern coast of Australia, and is not very uncommon an where, though good specimens may not always be obtainable, it grows in deep water, and is only washed ashore after stro gales. Its chief characters lie in the very decompound branche the wide angles that its branches and all their divisions ma with the stem, the great length of the fruit-stalks in proporti to the fruit, and finally the globular or shortly oval form of t fruit-receptacles. These characters generally serve to separate from *S. comosus* (Pl. CIV.), but now and then partially i termediate forms may be found between them. The present the longest known of the Australian *Sporochni*.

Fig. 1. SPOROCHNUS RADICIFORMIS,—*the natural size.* 2. Fragment of branch. 3. Receptacles, of different ages:—*magnified.*

Plate



Vincent Brook

Plate CCXXVI.

SPOROCHNUS SCOPARIUS, *Harv.*

Gen. Char. *Frond* filiform, solid, pinnately decompound. *Receptacles* pod-shaped, pedicellate (rarely sessile), crowned with a tuft of soft hairs, and densely covered with whorled, branching, sporiferous filaments. *Spores* obovoid, attached to the sides of the filaments.—Sporochnus (*Ag.*), from *σπορος, a seed,* and *χνοος, wool,* because tufts of soft hairs crown the fructification.

> *Frons filiformis, solida, pinnatim ramosa. Receptacula siliquæformia, pedicellata (rarissime sessilia), apice comosa, paranematibus ramosis horizontalibus verticellatis densissime vestita. Sporæ obovoideæ, ad paranemata laterales.*

Sporochnus *scoparius;* frond terete, rigid, robust, tree-like (2–3 feet high); stem velvety; branches dense, spreading to all sides, decompound-pinnate, angular, glabrous, the smaller ones erect, straight, sparsely spinous, subalternate; receptacles oval or oblong, on peduncles much longer than themselves.

> S. scoparius; *fronde terete rigida crassa dendroidea* (2–3-*pedali*)*; caule velutino; ramis creberrimis undique egredientibus decomposito-pinnatis angulatis glabris, minoribus erectis strictis sparse spinosis subalternis; receptaculis ovalibus aut oblongis pedicellum ipsis multiplo longius coronantibus.*

Sporochnus scoparius, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 535.

Hab. Garden and Rottnest Islands, and at Cape Riche, *W. H. H.*

Geogr. Distr. West and south-west coasts of Australia.

Descr. *Root* a large conical mass, coated with woolly fibres, and sometimes an inch in diameter and height. *Fronds* solitary, tree-like, very robust at base, and coated for a considerable distance upwards with velvety hairs; the stem simple or forked, set throughout with closely placed, erect, or erecto-patent branches, which are repeatedly decompound. Old fronds are very bushy. All the divisions are remarkably straight and erect, with acute axils; the terminal are setaceous, the smaller branches laxly set with small erect or appressed spines, or bare. The young *receptacle* is globose or elliptical, the older obovoid, conical at base: the tufts of filaments are of much darker colour and rather more rigid and persistent than in most other species. The *colour* is a dark olive-brown, becoming darker in drying. The *substance* is rigid; the young frond adheres imperfectly to paper, the old does not adhere.

* * *

This species is in many respects allied to *S. radiciformis,* figured on the preceding Plate, but is a much more robust and every way larger plant, with very erect, broom-like ramification and branchlets, a longer and more basally tapering fruit-receptacle, coarser and more persistent pencils of filaments, and a larger root-bulb. The lower part of the stem, for a considerable distance above the base, is, in old specimens particularly, clothed with short pubescence. On the whole, the general aspect and these particular differences serve to distinguish our plant from *S. radiciformis.* To none other of the genus is it particularly near. Its appearance and rigid substance rather recall *Carpomitra inermis* than any *Sporochnus.*

Fig. 1. SPOROCHNUS SCOPARIUS,—*the natural size.* 2. Fragment of a branch. 3. Receptacles, of different ages :—*magnified.*

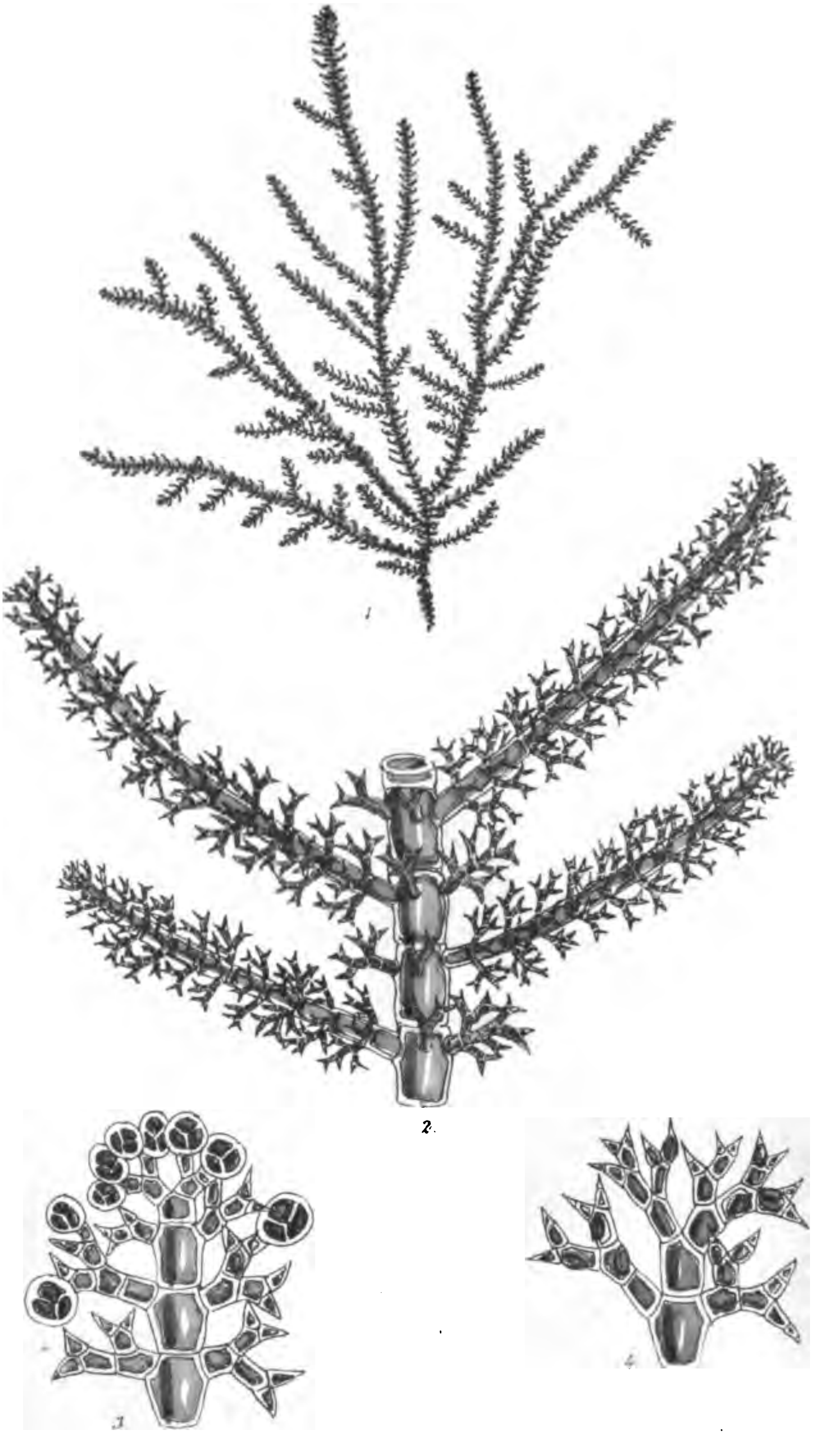

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PLATE CCXXVII.

CALLITHAMNION DISPAR, *Harv.*

GEN. CHAR. *Frond* filiform, branched, articulated, monosiphonous, the stem and branches (in many species) at length thickened internally, or coated externally with decurrent filaments; ramuli always pellucidly articulate and monosiphonous. *Fructification:* 1, *favellæ* generally in pairs, axillary or sessile on the branches, naked, containing numerous angular spores; 2, *tetraspores* naked, sessile or pedicellate, distributed on the ramuli, generally triangularly parted.—CALLITHAMNION (*Lyngb.*), from καλλις, *beautiful,* and *θαμνιον, a little shrub.*

Frons filiformis, ramosa, articulata, monosiphonia, caule ramisque majoribus (in pluribus), demum fibris decurrentibus interne vel externe evolutis corticatis v. firmatis; ramulis semper pellucide articulatis. Fruct.: 1, *favellæ binatæ, axillares v. ad ramos sessiles, nudæ, sporas numerosas angulatas foventes;* 2, *tetrasporæ nudæ, ad ramulos sessiles v. pedicellatæ, triangule v. cruciatim divisæ.*

CALLITHAMNION *dispar;* frond pellucidly articulate, capillary, more or less pinnate, distichous; primary branches few, unequal, virgate, bipinnate; pinnæ opposite, spreading, unequal, one shortened, the other long and pinnulated; pinnules opposite or 3-4-stichous, equal, horizontal, thick, multifid, mucronate; joints of the branches twice, of the pinnæ 1½ as long as broad, of the pinnules short; tetraspores sessile on the sides or ends of the pinnules.

C. dispar; *fronde pellucide articulata capillari plus minus pinnatim ramosa disticha; ramis primariis paucis inæqualibus virgatis bipinnatis; pinnis oppositis patentibus inæqualibus una abbreviata altera elongata pinnulata; pinnulis oppositis æqualibus horizontalibus crassis multifidis mucronatis; articulis ramorum diametro duplo pinnarum sesqui-longioribus, pinnularum diametro æqualibus; tetrasporis ad latera pinnularum sessilibus.*

CALLITHAMNION dispar, *Harv. Alg. Austr. Exsic. n.* 509. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 335.

HAB. Port Fairy, Victoria, *W. H. H.* Warnambool, *H. Watts,* 112, 127, 142. East coast of Tasmania, *R. Gunn.*

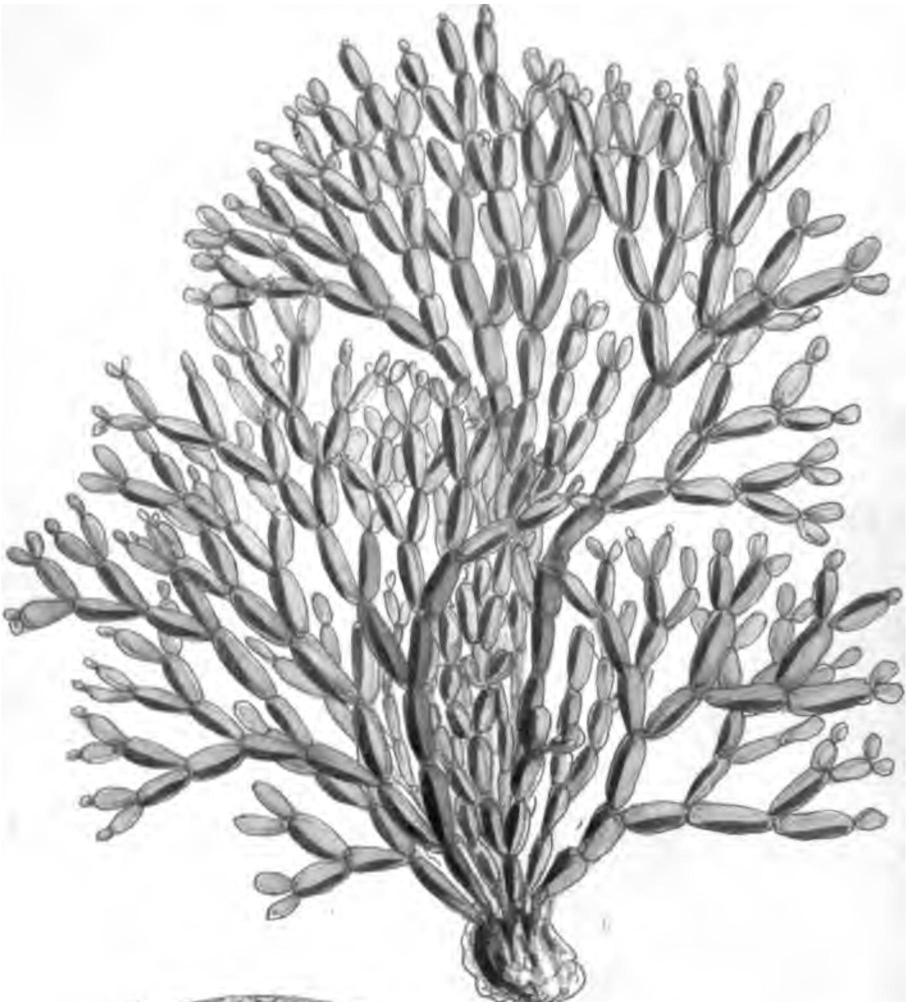
GEOGR. DISTR. South coast of Australia. Tasmania.

DESCR. *Root* a small disc. *Fronds* solitary or few together, 1-3 inches high, irregularly branched, distichous, pellucidly articulate throughout. *Branches* opposite, alternate or secund, lateral, very unequal in length, long and short intermixed, simple, virgate, erecto-patent; when not opposite each is opposed by a small ramulus. The larger branches sometimes bear a smaller second series: both primary and secondary branches are furnished at every joint with minute, multifid, dichotomous, opposite or whorled ramuli, whose articulations are very short, and the terminal cellules acute or mucronate. *Articulations* of the branches oblong, nearly twice as long as broad. *Tetraspores* globose, near the ends of the ramuli, sessile. *Colour* a dark red-brown. *Substance* firm, but soft. In drying the frond adheres closely to paper.

In external aspect this pretty little plant is not unlike some species of the group to which the British *C. tetragonum* belongs; but it properly falls under the division with opposite ramuli, although here the regular opposition is partially concealed by the very unequal development of the opposing pinnæ,—an inequality which has suggested the specific name, *dispar*. Similarly unequal opposite pinnæ are of frequent occurrence on the genus *Ptilota*, and are found also in two species of *Ballia*.

I do not know any species of *Callithamnion* with which this plant need be contrasted. It is not uncommon, growing in the stems and branches of the Fucoid Algæ.

Fig. 1. CALLITHAMNION DISPAR,—*the natural size*. 2. Portion of a branch, with its unequal ramuli, a long ramulus opposing an abortive one. 3. Ramellus bearing *tetraspores*. Ramellus bearing *antheridia?*:—*magnified*.



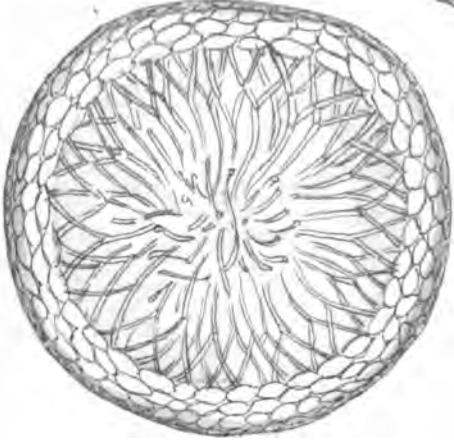


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Plate CCXXVIII.

GALAXAURA OBTUSATA, *Lamx.*

Gen. Char. *Frond* dichotomous, thinly incrusted with carbonate of lime, constricted as if jointed, or continuous, composed of longitudinal, colourless, interwoven, and anastomosing *medullary* filaments, and closely placed, inflated or tabular, coloured *peripheric* cellules. *Fruit* unknown.—Galaxaura (*Lamx.*), a classical name; one of the Oceanidæ of Hesiod.

Frons dichotoma, calcareo-incrustata, articulato-constricta v. continua, plus minus transversim rugulosa, ex filis medullaribus tenuibus hyalinis longitudinalibus intertextis anastomosantibus, et cellulis periphericis subuniseriatis coloratis inflatis liberis v. complanatis, arcte cohærentibus, formata. Fructus ignotus.

Galaxaura *obtusata;* dichotomous, fastigiate, constricted at the nodes as if jointed; articulations oval or obovate, the uppermost oblong.

G. obtusata; ***dichotoma, fastigiata, articulato-constricta; articulis ovalibus v. obovatis, supremis oblongis.***

Galaxaura obtusata, *Lamx. Pol. Flex. p.* 262. *Kütz. Sp. Alg.* 529. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 317.

Corallina obtusata, *Ell. and Sol. t.* 22. *f.* 2.

Alysium Holtingii, *Ag. Sp. Alg. v.* 1. *p.* 433.

Ulva Holtingii, *Mert.*

Hab. West Australia, *G. Clifton.* Norfolk Island, *Dr. McWilliam.*

Geogr. Distr. The tropical Ocean, in all longitudes. Bahamas. West Indies. Pernambuco. Port Natal. Algoa Bay. West Australia. Pacific Islands.

Descr. *Root* a tuberiform mass of interwoven fibres, more or less covered with calcareous deposit. *Fronds* very many from the same concrete base, 4–8 inches long and nearly as much in the expansion of the branches, flabelliform in outline, regularly dichotomous, fastigiate, thinly coated with a smooth enamel of carbonate of lime. The frond throughout is strongly contracted at the nodes into bead-like portions or spurious articulations; these are oblong, obovate, or linear, in different parts of the frond; the very young ones are globose, the old ones are 3–4 times as long as broad. The axils are wide and the apices obtuse. No fruit has been observed. The frond is traversed by many longitudinal filaments, which emit dichotomous branches towards the periphery or outer wall of the branch. This is formed of two or more series of hexagonal or roundish angular cells, and the surface composed of flattened tabulated cellules. The *colour* is a dull livid-purple, becoming greenish and at length white in old-age. The *substance* is membranous, and somewhat rigid from the calcareous indument. The frond does not adhere to paper in drying.

This species, first described by Ellis and Solander as a species of *Corallina,* is commonly found on reefs throughout the tropical ocean of both hemispheres; and occasionally, as on the shores of South Africa and Australia, occurs in the warmer districts of the temperate zone. Specimens from widely separated localities scarcely vary in any tangible character. Some are rather more luxuriant than others; and the colour varies with the age or exposure of each individual specimen, but the ramification is very constantly the same in all. It is by no means common in temperate Australia, but probably abounds in the almost unexplored intratropical coasts.

Fig. 1. GALAXAURA OBTUSATA,—*the natural size.* 2. Cross section of the frond. 3. Tabulated cells of the periphery:—*magnified.*

Plate [illegible]

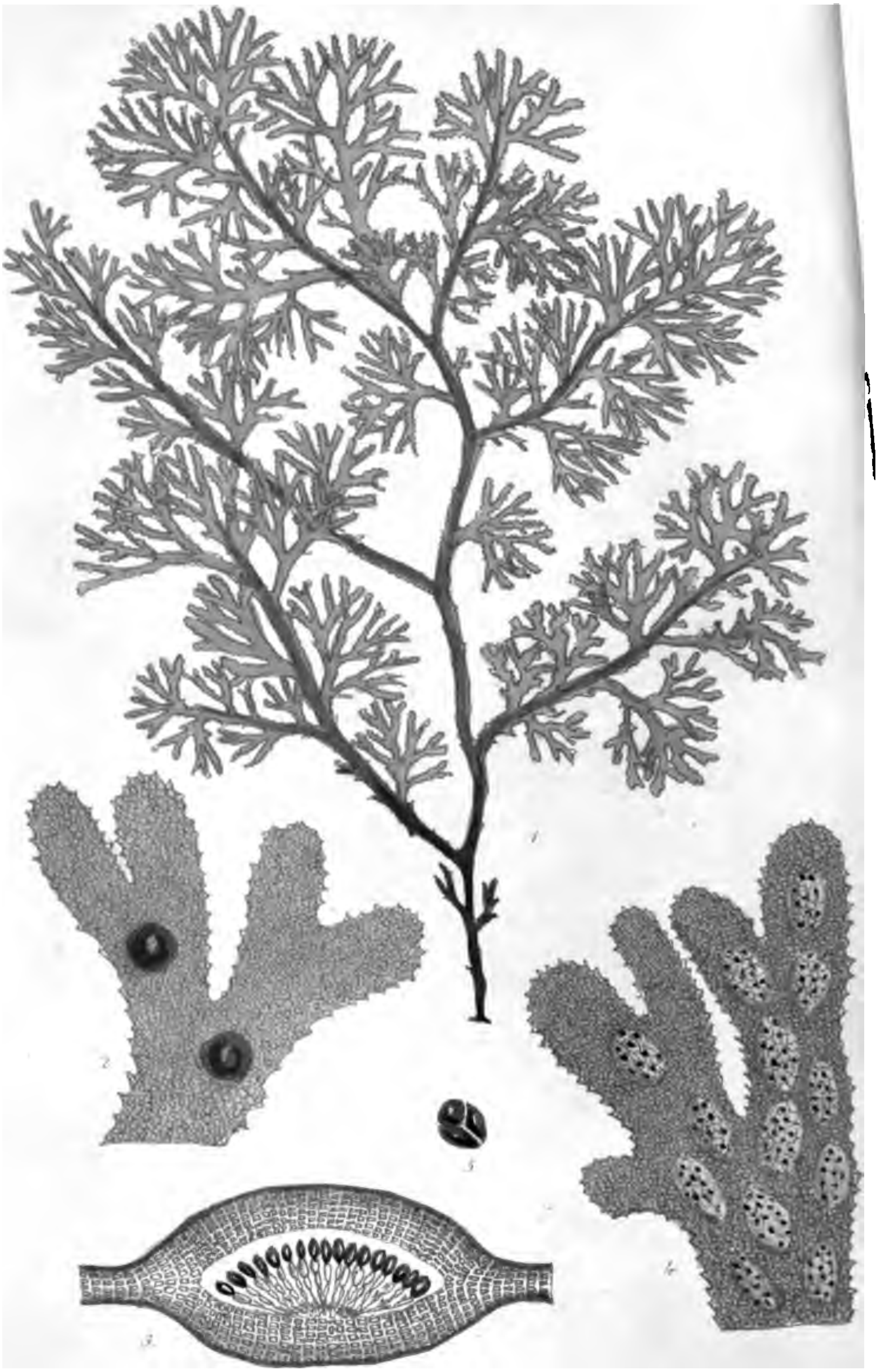

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PLATE CCXXIX.

NITOPHYLLUM PRISTOIDEUM, *Harv.*

GEN. CHAR. *Frond* membranaceous, expanded, areolate, unsymmetrical, nerveless or irregularly veined. *Fructification :* 1, hemispherical *conceptacles,* sessile on the frond, containing a tuft of moniliform spore-threads, on a basal placenta; 2, tripartite *tetraspores,* in definite sori or spots, scattered, or confined to some part of the frond.—NITOPHYLLUM (*Grev.*), from *nitor,* 'to shine,' and *φυλλον, a leaf.*

Frons membranacea, expansa, areolata, vage fissa, enervia v. basi venulis irregularibus peragrata. Fruct.: 1, *coccidia frondi sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

NITOPHYLLUM *pristoideum;* stipes elongate, thickened, but scarcely ribbed; frond narrow-linear, decompound, much branched, dichotomous, the minor segments flabelliform; the margin denticulate; apices blunt; axils wide; membrane rigid, composed of several rows of cells; cystocarps globose, scattered; sori minute, oval, clustered near the ends of the segments.

N. pristoideum; *stipite elongato incrassato subecostato ; fronde angustissima lineari decomposito-ramosissima dichotoma ; laciniis minoribus flabelliformibus ; margine dentato ; apicibus obtusis ; axillis apertis ; membrana rigidiuscula, stratis pluribus cellularum constituta ; cystocarpiis sparsis ; soris minutis ovalibus apicem versus laciniarum aggregatis.*

NITOPHYLLUM pristoideum, *Harv. in Herb. Alg. Austr. Exsic. n.* 292.

HAB. South Australia, *Dr. Curdie.* Port Fairy and Western Port, *W. H. H.* Warnamboul, *H. Watts,* n. 137.

GEOGR. DISTR. South Coast of Australia.

DESCR. *Root* discoid. *Frond* 4–6–8 inches long, and 3–6 in the expansion of the segments. *Stipes* 1–2 lines wide, 3–4 inches long or more, simple or branched, flexuous, thickened and somewhat opaque in the centre, but scarcely ribbed. *Frond* excessively decompound, with irregularly dichotomous ramification; the minor divisions flabelliform and fastigiate, but the general outline irregular; the greater and lesser branches and their divisions all of nearly uniform breadth, 1–2, rarely 3 lines wide, linear, uniformly denticulate at the margin; the axils wide and the apices blunt. *Cystocarps* hemispherical, scattered over the membrane, but most frequent near the ends of the segments. *Sori* dot-like, oval, prominent, crowded together in the ultimate divisions of the frond. *Colour* a full dark-red, becoming brownish-red in the herbarium. *Substance* rather rigidly membranous. In drying the young frond adheres strongly to paper; the adult frond and the stipes imperfectly.

This species is readily known by the very decompound frond, with linear multipartite lobes, combined with the uniformly denticulate margin, the dark colour, and the rigid substance. It is perhaps most nearly related to *N. Gunnianum*, though abundantly different in aspect.

The specific name *pristoideum* refers to the general external resemblance which our plant bears to the *Suhria pristoides* of the Cape of Good Hope. That species was so called from a supposed resemblance between its serrulated ultimate lobes and the serrated snout of the Saw-fish (*Pristis antiquorum*).

This plant was first found by Dr. Curdie, of Geelong, near the mouth of the Glenelg, and seems to be not uncommon on the coast between that point and Western Port, but has not yet been noticed elsewhere.

Fig. 1. NITOPHYLLUM PRISTOIDEUM,—*the natural size*. 2. Apex, with *cystocarps*. 3. Section of a cystocarp. 4. Apex, with *sori* of *tetraspores*. 5. A tetraspore.

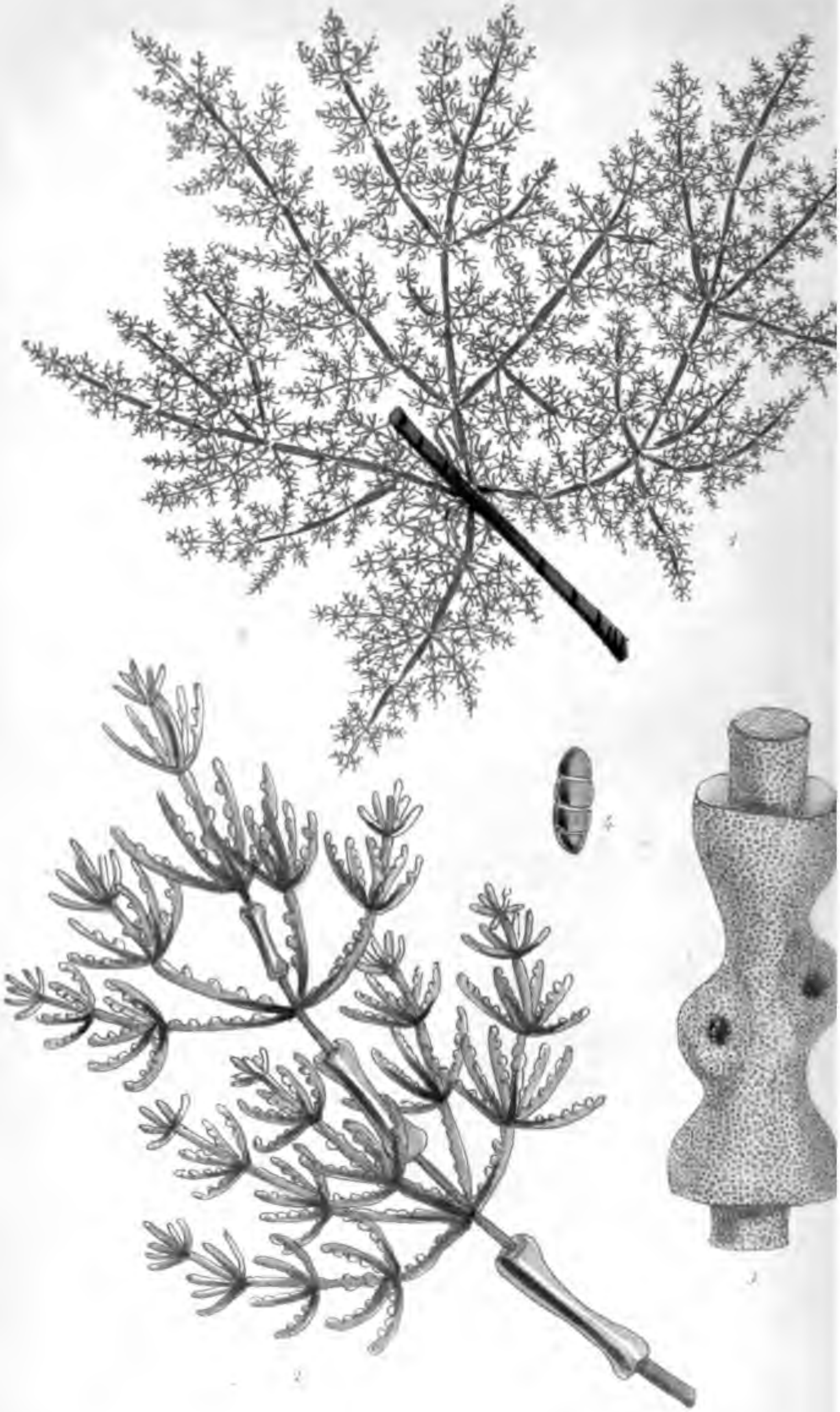
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PLATE CCXXX.

AMPHIROA STELLIGERA, *Lamarck.*

GEN. CHAR. *Frond* terete, compresssed, or flat, calcareous, articulated, dichotomous, pinnated or whorled. *Nodes* cartilaginous. *Fruct.:* 1, *conceptacles* conical, wart-like, sessile on the disc of the articulations, furnished with an apical pore, and containing in the base of the cavity a tuft of erect, pyriform, at length four-parted spore-threads.—AMPHIROA (*Lamour.*), a fanciful mythological name.

Frons calcarea, fragilis, teres v. compressa v. plana, articulata, dichotoma v. pinnatim ramosa v. verticillata. Genicula cartilaginea. Fr.: 1, *conceptacula conica, verrucæformia, ad superficiem articulorum sessilia, apice poro pertusa, in fundo loculi fila sporifera fasciculata erecta demum quadripartita, foventia.*

AMPHIROA *stelligera;* frond elongate, terete, slender, the primary di-trichotomous, decompound, much branched, the smaller branches and ramuli whorled; joints cylindrical, equal, or those of the main branches thickened at each end, the lower ones very short, the upper 6–8 times as long as broad; nodes naked, filiform, the lower and medial ones elongate, the uppermost as long as broad; ceramidia secund on the ramuli.

A. stelligera; *fronde elongata tereti tenui, primaria di-trichotoma decomposito-ramosissima, ramis minoribus ramulisque verticillatis; articulis cylindraceis æqualibus vel mediis basi et apice incrassatis, inferioribus brevissimis, supremis diametro* 6–8-*plo longioribus; geniculis nudis filiformibus, inferioribus mediisque longissimis, supremis diametrum longitudine æquantibus; ceramidiis ad ramulos secundis.*

AMPHIROA stelligera, *Lamarck, Mem. Mus. v.* 2. *p.* 239. *Dcne. Cor. p.* 112. *Harv. Ner. Austr.* 96. *Aresch. in J. Ag. Sp. Alg. v.* 2. *p.* 540. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 310. *Harv. Alg. Exsic. Austr. n.* 461. *Kütz. Sp. Alg.* 701.

AMPHIROA interrupta, *Lamour. Pol. Flex. p.* 300. *t.* 11. *f.* 5 *A.*

AMPHIROA jubata, *Lamour. l. c. p.* 304. *t.* 11. *f.* 6. *Aresch. Phyc. Extraeur. Exsic. n.* 24.

AMPHIROA elegans, *Sond. Pl. Preiss. v.* 2. *p.* 187.

CORALLINA stelligera, *Lamarck, l. c.*

HAB. On the stems of *Cymodocea antarctica,* common.

GEOGR. DISTR. Western, southern, and eastern shores of Australia. Tasmania.

DESCR. *Fronds* densely tufted, many-stemmed, 3–6 inches or more in length.

Stems mostly trichotomous, the lateral divisions short, and the general o line lanceolate. The minor branches and ramuli are uniformly whorl 4–5 or more springing from each node, and generally the internodes a ultimate ramuli consist of single joints. *Articulations* cylindrical, the older ones thickened at each end; the lower ones short, the med and upper ones many times longer than their breadth. In the stems a larger branches the *nodes* (connecting the calcareous joints) are sometin twice as long as the joint or internode, thread-like and horny; in the smal branches they are short, and in the ultimate ramuli inconspicuous. C *tocarps* are abundant both on the ramuli and the internodes of the lar branches, and are usually secund; very often they are so closely placed to form a row of unilateral tubercles. The *colour* when living is a vi purple; becoming pale-red, and at length white in decay. The *substa* is brittle, and the frond does not adhere to paper in drying.

A very beautiful species of *Amphiroa,* allied to *A. charoid* but very much more slender in every part, more finely divid and ramulous. The whorls of slender ramuli somewhat resem small, multiradiate stars, whence the specific name. When fruit almost the whole frond becomes thickly warted with sm tubercles.

The species is very extensively distributed along the Aust lian coasts, and so far as I have observed, it generally grows the rigid stems of the *Cymodocea* (or *Amphibolis*), which it som times thickly clothes, to the exclusion of all other parasit The stems, so covered, seen waving under water have a ve beautiful aspect.

Fig. 1. AMPHIROA STELLIGERA,—*the natural size.* 2. Part of a branch, w whorled lesser branches and ramuli. 3. An articulus, with two *cerami* from a main branch, after the lime has been removed by acid. 4. A *tet* *spore:—variously magnified.*

Plate CCCI

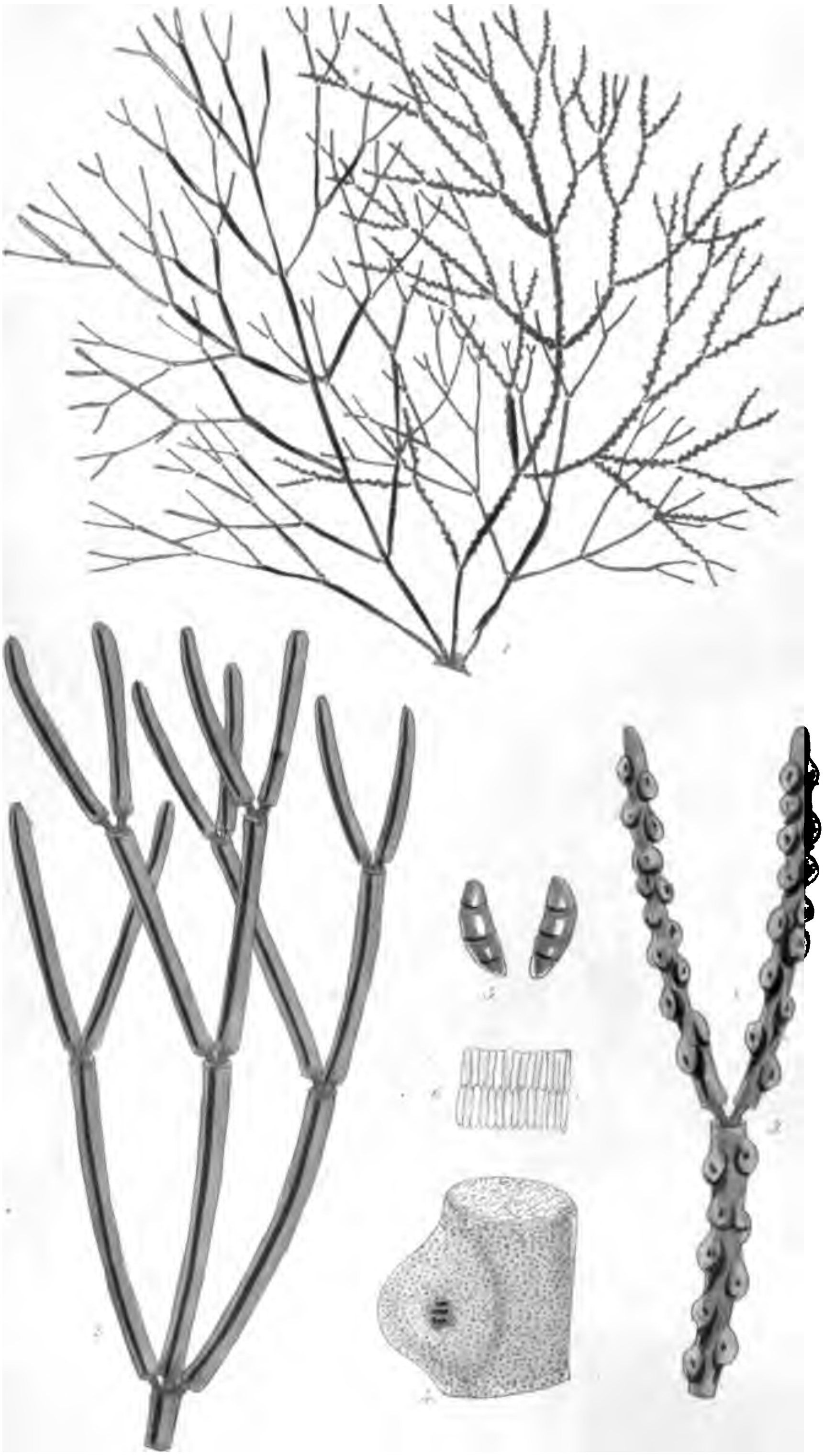


PLATE CCXXXI.

AMPHIROA GRACILIS, *Harv.*

GEN. CHAR. *Frond* terete, compressed, or flat, calcareous, articulated, dichotomous, pinnated or whorled. *Nodes* cartilaginous. *Fruct.:* 1, *conceptacles* conical, wart-like, sessile on the disc of the articulations, furnished with an apical pore, and containing in the base of the cavity a tuft of erect, pyriform, at length four-parted spore-threads.— AMPHIROA (*Lamour.*), a fanciful mythological name.

Frons calcarea, fragilis, teres v. compressa v. plana, articulata, dichotoma v. pinnatim ramosa v. verticillata. Genicula cartilaginea. Fr.: 1, *conceptacula conica, verrucæformia, ad superficiem articulorum sessilia, apice poro pertusa, in fundo loculi fila sporifera fasciculata erecta demum quadripartita foventia.*

AMPHIROA *gracilis;* frond elongate, terete, slender, di-trichotomous, fastigiate; joints cylindrical, equal, truncate at the base and apex, all very long, 10–14 times as long as broad; nodes naked, as long as broad; ceramidia very numerous, directed to all sides.

A. gracilis; *fronde elongata tereti tenui di-trichotoma fastigiata; articulis cylindraceis æqualibus basi et apice truncatis omnibus longissimis diametro* 10–14-*plo longioribus; geniculis nudis diametro æqualibus; ceramidiis numerossimis quoquoversis.*

AMPHIROA gracilis, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 547. *Harv. Alg. Exsic. Austr. n.* 459.

HAB. King George's Sound and Rottnest Island, common, *W. H. H.*

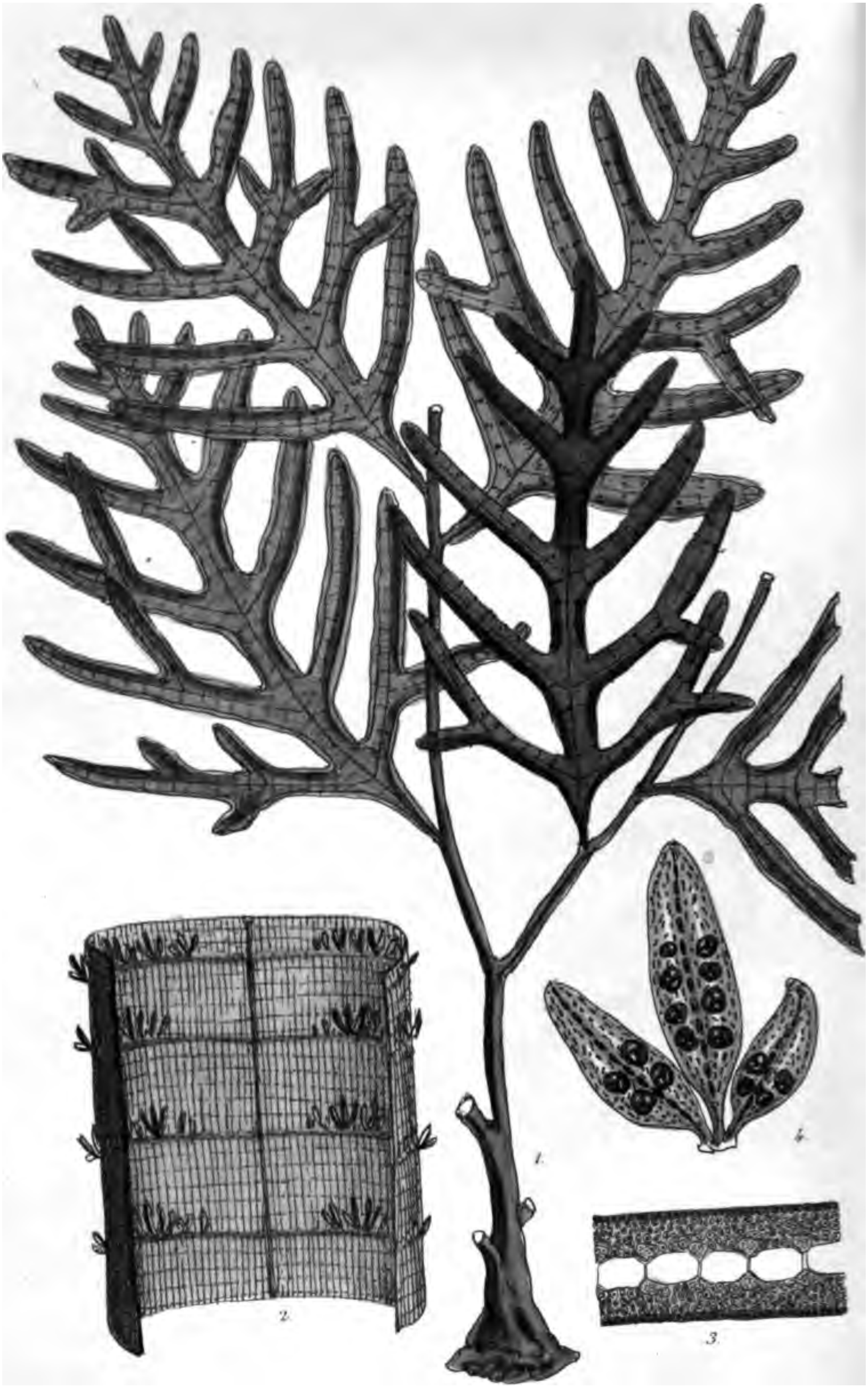
GEOGR. DISTR. Western Australia.

DESCR. *Fronds* tufted, 3–4 inches high, trichotomous or rarely dichotomous, occasionally some of the main divisions whorled. *Branches* cylindrical, slender; lower as well as upper articulations many times longer than their diameter, cylindrical and equal, truncate at each end, or but little incrassated. The *nodes* are short throughout; in the larger branches they are about as long as broad, in the lesser ones much shorter, and in the ultimate divisions inconspicuous. *Cystocarps* prominent, tubercular, formed not only on the upper, but on the medial and often on the lower articulations, closely placed and directed to every side. The *colour*, when recent, is a full purple, becoming pale-red or white after death and on exposure. The *substance* is very brittle, and the frond does not adhere to paper in drying.

* * *

This appears to be a common form in Western Australia, and may possibly occur also along the southern coast, though no specimens have been sent to me therefrom. It belongs to the same section as *A. stelligera,* but differs from that in its trichotomous but not *whorled* ramification, in the proportions of its joints, the short nodes, different arrangement of fruit, etc. It is perhaps more nearly allied to *A. intermedia,* but has longer joints, different ramification, etc.

Fig. 1. AMPHIROA GRACILIS,—*the natural size.* 2. Sterile apex of the frond. 3. A fertile apex, warted with *ceramidia.* 4. Frustule of a joint, with a *ceramidium,* after the lime has been removed by acid. 5. *Tetraspores.* 6. Some of the cellular tissue of the axils :—*variously magnified.*



Vincent Brooks.Ir

PLATE CCXXXII.

KUETZINGIA CANALICULATA, *Sond.*

GEN. CHAR. *Frond* flat, linear, pinnatifid, corticate, midribbed, and transversely striate. Interior cells empty, uniseriate, tetrahedral, arranged in transverse rows; cortical layer thick, of many rows of minute coloured cellules. *Ceramidia* unknown. *Stichidia* oblong, pedicellate, rising from the transverse striæ, containing tetraspores in a double row.—KUETZINGIA (*Sond.*), in honour of Prof. F. T. Kützing, the celebrated author of 'Phycologia Generalis,' and other well-known works.

Frons plana, linearis, pinnatifida, corticata, costata, transversim striata. Cellulæ interiores hyalinæ, uniseriatæ, tetrahedræ, transversim ordinatæ; corticales pluriseriatæ, minimæ, coloratæ. Fruct.:* 1, *ceramidia* (*ignota*); 2, *stichidia oblonga, pedicellata, e striis transversis enata, tetrasporas duplici serie foventia.

KUETZINGIA *canaliculata;* stipes long, naked, terete, simple or forked, many-fronded; fronds pinnatifid or sub-bipinnatifid, pinnæ and pinnules broadly linear, channelled, with inflexed edges, very slender midribs, and rounded, concave apices.

K. canaliculata; ***stipite elongato nudo tereti simplici vel plus minus furcato multifrondoso; frondibus pinnatifidis v. sub-bipinnatifidis, pinnis pinnulisque late linearibus canaliculatis (marginibus inflexis) tenuissime costulatis, apice concavis obtusis.***

KUETZINGIA canaliculata, *Sond. in Bot. Zeit.* 1845, *p.* 54. *Pl. Preiss v.* 2. *p.* 184. *Harv. Ner. Austr. p.* 23. *t.* 9. *Kütz. Sp. Alg. p.* 846. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 538. *Alg. Austr. Exsic. n.* 130.

RYTIPHLŒA canaliculata, *Grev. in Edin. Journ. Nat. and Geogr. Scien. N. S., v.* 3. *t.* 4. *f.* 1.

HAB. New Holland, *Frazer.* Western Australia, *Preiss!, Mylne!* King George's Sound and Fremantle, *W. H. H., G. Clifton,* etc.

GEOGR. DISTR. West and south-west shores of Australia.

DESCR. *Root* a thickened conical tuber, half an inch or more in diameter. Full-grown frond from 8 inches (in shallow water) to 2 feet or more (in deep water) in height; the older specimens dendroid, excessively branched and bushy. *Stem* cylindrical, hard and stiff, zigzag, irregularly forked, 3–12 inches long or more, a line in diameter below, ½ a line above. *Fronds* springing from the sides of the stem and from the ends of its branches, ovate in outline, either simply or doubly pinnatifid, sometimes almost fasci-

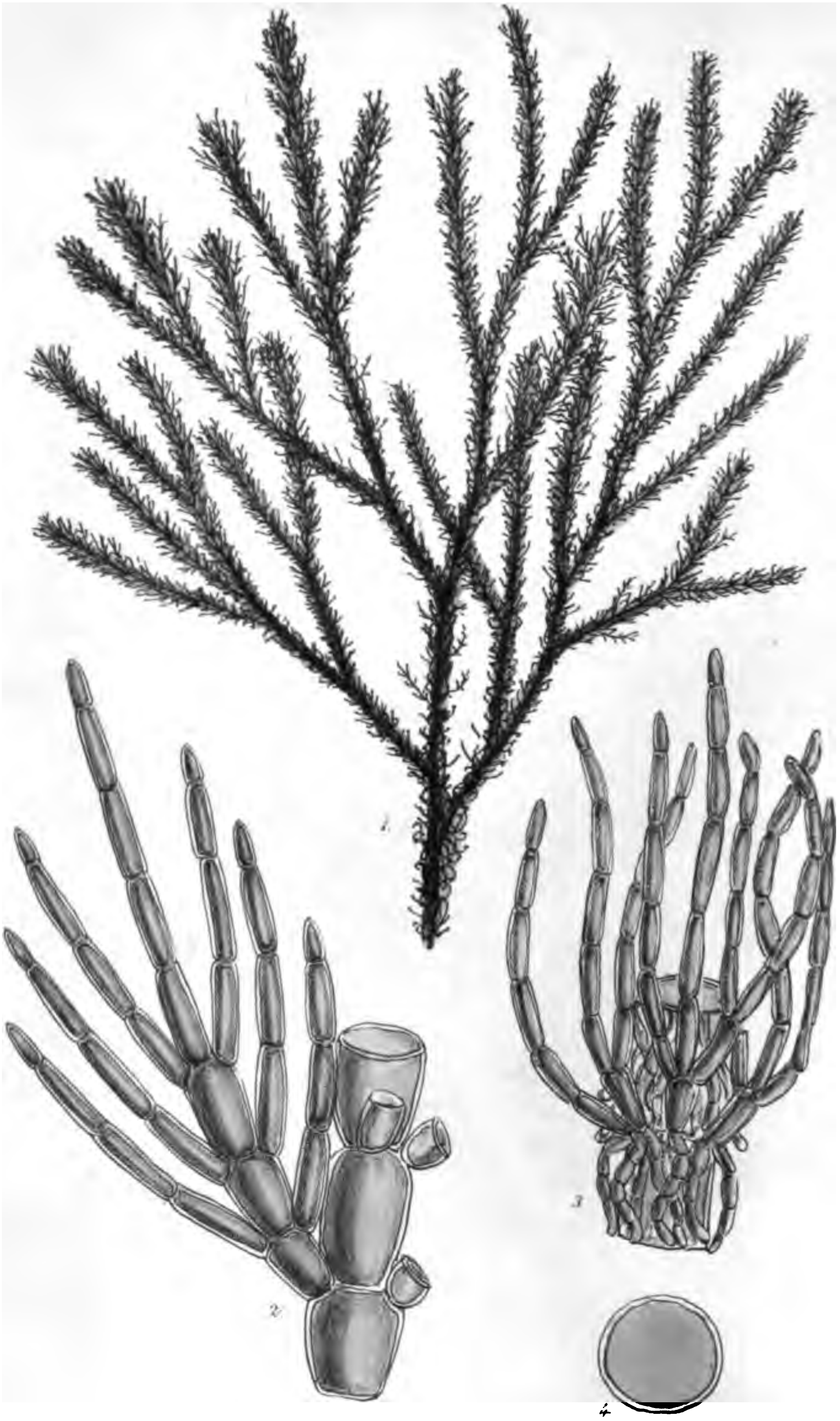
culate from the approximation of pinnæ on a short rachis. *Segments*
every part linear, 2–4 lines wide, rounded at the extremity, concave
channelled, with inflexed edges, but not with involute apices, each travers
by a very slender midrib. Under a pocket-lens the frond appears elegan
netted by the crossing of longitudinal and transverse, closely-placed lin
which divide the surface into minute, oblong, rectangular spaces; th
lines are the boundary walls of internal cavities, which form a stratum
honeycomb cells in the centre of the membrane, and they cease to be visi
when the surface is examined with a microscope. No *ceramidia* have
been observed. *Stichidia* are very commonly formed; they are linear
lanceolate, solitary or clustered, and always placed in transverse lines co
necting the margin with the midrib. *Colour* a dark brown-red, becomi
blackish in the herbarium. The *substance* is tough and rigid, but semi-tra
lucent; and the frond does not adhere to paper in drying.

It is hoped that the present figure and description will bett
illustrate this fine plant than those given in 'Nereis Australi
and which were prepared from the very imperfect specimens th
known to me. Some of the larger specimens I now posse
would require a folio of large size to do them justice. The
were cast up from deep water. When growing at the edge
low water, as at Middleton Bay, King George's Sound, the fro
is much more dwarf and bushy, rarely reaching a foot in heig
and is very generally deformed by parasitic growths of *Corallin*
etc. The largest specimens I have seen were cast ashore ne
the lighthouse, on Rottnest Island.

My friend George Clifton and other collectors in Western Au
tralia will do well to look for the *ceramidia* of this plant, whi
are as yet unknown to botanists. Probably they resemble tho
of a *Lenormandia*.

Fig. 1. Kuetzingia canaliculata, portion of an adult frond,—*the natu*
size. 2. Small portion of a pinnule, bearing *stichidia*. 3. Cross section
the frond. 4. A cluster of *stichidia*, bearing *tetraspores:—all magnified*

Plate CCXVIII



Vincent Brooks, Imp.

PLATE CCXXXIII.

WRANGELIA WATTSII, *Harv.*

GEN. CHAR. *Frond* filiform, decompound, articulated, one-tubed; the *internodes* naked or coated with minute cellules; the *nodes* clothed with opposite or whorled articulated ramelli. *Fructification*: 1, *cystocarps* terminating short branches, involucrated by the uppermost whorled ramelli, and consisting of tufts of pear-shaped pedicellate *spores* and slender *paranemata*; 2, naked, triangularly parted *tetraspores*, borne on the sides of the whorled ramelli.—WRANGELIA (*Ag.*), in honour of Baron v. Wrangel, a Swedish naturalist.

Frons filiformis, decomposita, articulata, monosiphonia, nuda v. cellulis corticata, verticillis ramellorum ad genicula onusta. Fruct.: 1, *cystocarpia ramos terminantia, ramellis supremis involucrata, fasciculis numerosis sporarum pyriformium pedicellatarum et paranematibus tenuibus constantia;* 2, *tetrasporæ nudæ, triangule divisæ, ad ramellos sessiles.*

WRANGELIA *Wattsii*; frond rigid, pellucidly articulate from the base, irregularly branched, subdichotomous; stem and main branches clothed with deflexed or decurrent root-like filaments, springing from the nodes, and also whorled with pinnate or subsimple erecto-patent ramelli; articulations of the ramelli 3–4 times as long as broad; apices obtuse; cell-margin very narrow.

W. Wattsii; *fronde rigidiuscula e basi pellucide articulata vage ramosa subdichotoma; caule ramisque majoribus filis deflexis v. decurrentibus e nodis enatis dense vestitis, et ad genicula verticillatim ramellosis; ramellis pinnatis v. simpliciusculis erecto-patentibus; articulis ramellorum diametro* 3-4-*plo longioribus, apicibus obtusis; margine angustissimo.*

WRANGELIA Wattsii, *Harv. in Herb. T. C. D.*

HAB. Cast ashore at Warnamboul, Victoria, *H. Watts, Esq., n.* 85, 88, 124, 134.

GEOGR. DISTR. South coast of Australia.

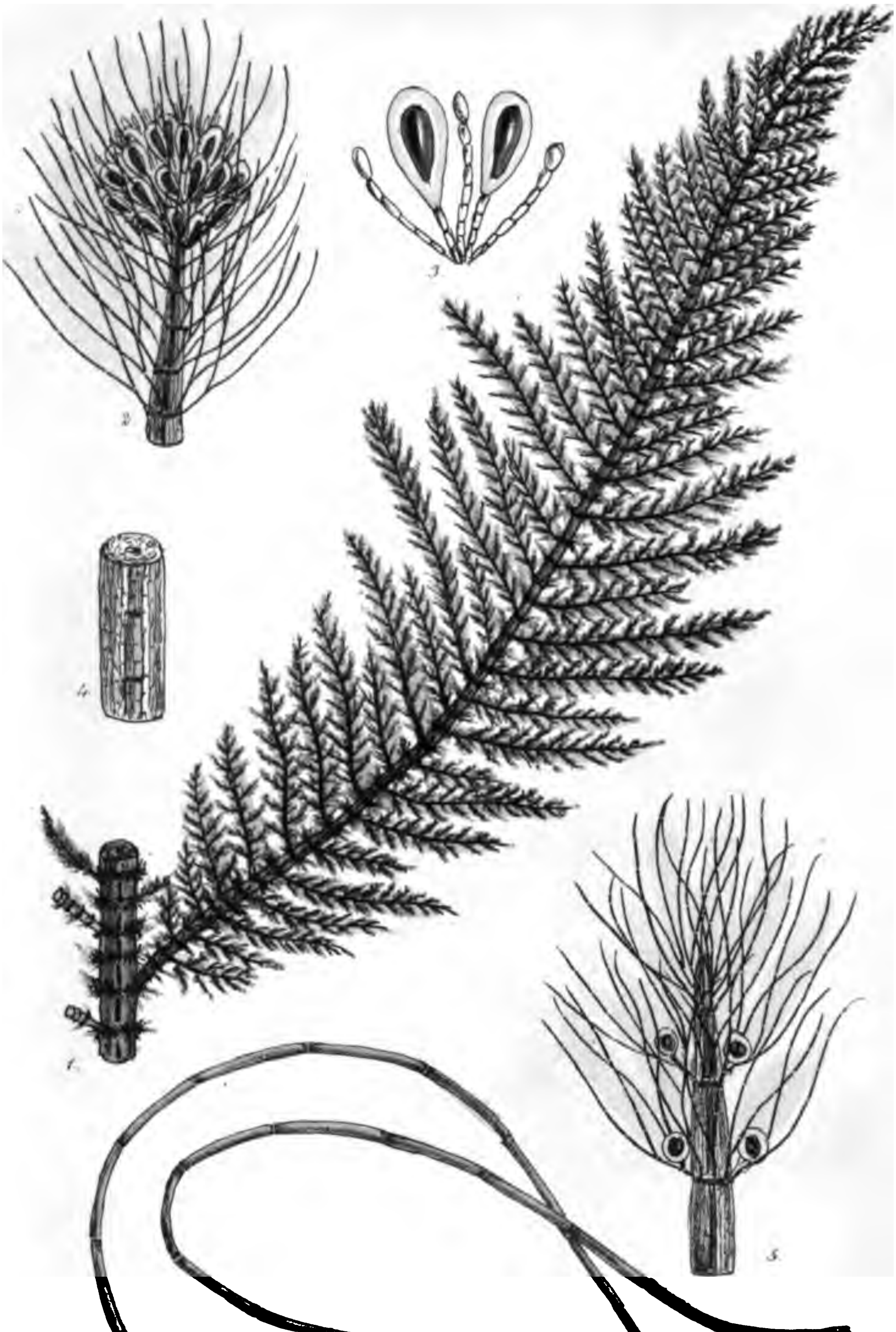
DESCR. *Root* clothed with fibres. *Frond* 3–6 inches long, irregularly branched, sometimes subpinnate, sometimes subdichotomous; branches erect or erecto-patent, virgate, subsimple. In the young parts of the fronds the branches are, at each articulation, whorled with 4–5 ramelli or set with a pair of opposite ramuli, and the internode, consisting of a single cell, is quite bare; but in all the older parts of the frond and in all parts of full-grown fronds, besides the whorled or opposite ramelli, the nodes emit numerous, root-like, flexuous fibres, which take a downward direction along the branch, and, extending from node to node, become interwoven into a fibrous sheath, that completely conceals (but does not adhere to) the joints of the branch. Thus the really *slender* branches of the frond, invested in this loose fibrous sheat appear to treble their proper diameter. The true *ramelli* are simply pinnat but often have but a single pair of pinnæ, or even but a single pinna, are quite naked: their apices are always blunt, and their articulations 3– times longer than broad. The *endochrome* completely fills the cell, leavin a very narrow, membranous (not gelatinous) cell-wall. No fruit has ye been seen. The *colour* is a dull red, becoming brownish in drying. Th *substance* is tough and rigid, and (except when very young) the frond ver imperfectly adheres to paper in drying.

This interesting species of *Wrangelia* is dedicated to M Henry Watts, of Warnamboul, to whom I am indebted for several packets of the Algæ of that part of the Victorian seacoast including many rare and interesting kinds, and some novelties among which this is the most remarkable. It is nearly allied t *W. crassa*, with which it agrees in many points of ramification but from which it greatly differs in substance and in the microscopic appearance of the articulations: in *W. crassa* each articulation has a very narrow endochrome, set in a very wide margi or gelatinous cell-wall; in *W. Wattsii* the endochrome fills up th whole space, and the cell-wall is membranous and very narro or thin. Whatever affinity therefore there may be between thes species, a single cell of either may be readily distinguished unde the microscope.

No fruit has yet been observed on *W. Wattsii*, but its genu nevertheless can hardly be considered as doubtful.

Fig. 1. WRANGELIA WATTSII,—*the natural size*. 2. A pinnated ramulus o plumule. 3. Fragment of an old branch, with whorled ramuli and deflexe radicular filaments. 4. Section of a branch :—*magnified*.

Plate CCXXXIV



Vincent Brooks, Imp.

Plate CCXXXIV.

WRANGELIA PRINCEPS, *Harv.*

Gen. Char. *Frond* filiform, decompound, articulated, one-tubed; the *internodes* naked or coated with minute cellules; the *nodes* clothed with opposite or whorled articulated ramelli. *Fructification:* 1, *cystocarps* terminating short branches, involucrated by the uppermost whorled ramelli, and consisting of tufts of pear-shaped pedicellate *spores* and slender *paranemata;* 2, naked, triangularly parted *tetraspores,* borne on the sides of the whorled ramelli.—Wrangelia (*Ag.*), in honour of Baron v. Wrangel, a Swedish naturalist.

Frons filiformis, decomposita, articulata, monosiphonia, nuda v. cellulis corticata, verticillis ramellorum ad genicula onusta. Fruct.: 1, *cystocarpia ramos terminantia, ramellis supremis involucrata, fasciculis numerosis sporarum pyriformium pedicellatarum et paranematibus tenuibus constantia;* 2, *tetrasporæ nudæ, triangule divisæ, ad ramellos sessiles.*

Wrangelia *Princeps;* frond elongate, very robust, corticated throughout, gelatinous and soft, decompound-pinnate; pinnæ virgate, lanceolate in outline, closely pinnate or bipinnate, the pinnules opposite but very unequal, or by abortion alternate; nodes of the branches, pinnæ, and pinnules whorled with byssoid ramelli; ramelli forked or dichotomous, cylindrical, their articulations many times longer than broad; apices blunt; cystocarps terminating short pinnules; tetraspores near the base of the ramelli.

W. Princeps; *fronde elongata crassa corticata gelatinosa mollissima decomposito-pinnata; pinnis virgatis in ambitu lanceolatis crebre pinnulatis bi-pinnulatisve; pinnulis oppositis valde inæqualibus v. abortione alternis; geniculis ramorum, pinnarum, pinnularumque ramellis byssoideis verticellatis; ramellis dichotomis, cylindraceis, eorum articulis diametro multoties longioribus; apicibus obtusis; cystocarpiis pinnulas coronantibus; tetrasporis ad ramellos sessilibus.*

Wrangelia Princeps, *Harv. Alg. Austr. Exsic. n.* 257.

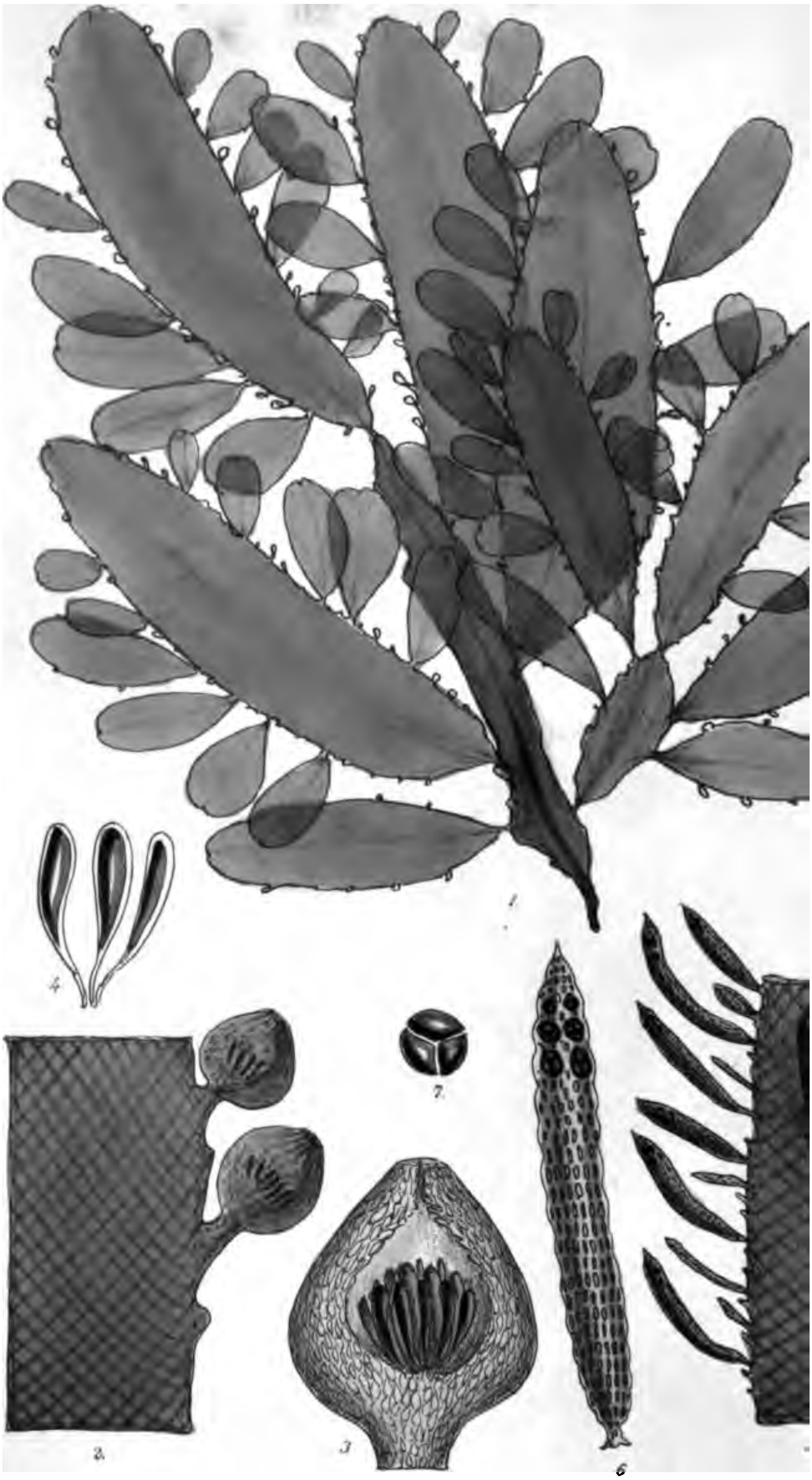
Hab. At Port Fairy, Port Philip Heads, and Western Port, Victoria, *W. H. H.* Garden Island, Western Australia, *G. Clifton, n.* 23, *Aug.* 1856.

Geogr. Distr. Western and southern shores of Australia.

Descr. *Root* a disc. *Frond* 12–18 inches to 2 feet in height, closely decompound-pinnate and feathery. *Stem* and main branches 1–2 lines in diameter, sometimes nearly 3 lines, set throughout with lateral, virgate pinnæ, 4–8 inches in length, and of a lanceolate outline. *Pinnæ* 2–4 lines apart, opposite, or by abortion alternate, often (when both are present) very unequal, the opposing pinna being reduced to a short ramulus or mere tuft of ramelli. *Primary* pinnæ about bipinnate, the pinnules by suppression alternate or unequally opposite, 1–2 inches long. *Ultimate* pinnules setaceous, 2–3 lines long. The stem, branches, pinnæ, and pinnules are corticated with a layer of minute cells, under which coating the primary siphon is, in the younger parts of the frond, partly visible. Every *node* throughout the frond is clothed with very soft and slender, byssoid, articulated, dichotomous ramelli, whose joints are very long: these are very abundant on the pinnules and smaller pinnæ, but gradually disappear in the older parts of the frond. *Cystocarps* occur, on more slender individuals, at the ends of the pinnæ and pinnules; the broadly pear-shaped spores are mixed with *paranemata*. *Tetraspores* globose, near the bases of the dichotomous ramelli. The *colour*, when growing, is a brilliant rosy-red, which in the herbarium is either discharged as a stain on the paper, or turns more or less brown. The *substance* is very soft, and soon becomes gelatinous, and in drying the frond adheres most closely to paper.

This superb plant, of which I can only, on an octavo plate, present a single branch, well deserves the name *Princeps*, even in a genus which contains many very beautiful species. It is very nearly allied in character to the original species (*W. penicillata*) upon which Agardh founded the genus *Wrangelia;* and is consequently also nearly related to the *W. plumosa*, so common on the shore at Geelong and on the north coast of Tasmania. But while *W. plumosa* is greatly larger and more robust than *W. penicillata*, it is but a pigmy when compared to our *W. Princeps*. The three stand to each other like steps of stairs, one advancing above the other, but the intervals between each—the steps—are so wide, that (at present) I must regard the three as distinct species, although, size excepted, they are very similar. The smallest and the largest are of the same *rose-red colour*, turning *brown* in drying; the intermediate (in size) is *dark-purple*, and turns *green* in drying.

Fig. 1. A pinnated branch of WRANGELIA PRINCEPS,—*the natural size*. 2. Apex of a ramulus, bearing a naked *cystocarp*. 3. Spores from the same. 4. Frustule of a branch, denuded. 5. Apex of a ramulus, bearing *tetraspores*. 6. A tetraspore, and one of the byssoid ramelli:—*more or less magnified.*



Vincent Bro

Ser. RHODOSPERMEÆ. Fam. *Rhodomelaceæ.*

PLATE CCXXXV.

LENORMANDIA MARGINATA, *Hf. et H.*

GEN. CHAR. *Frond* leaf-like, proliferous. *Phyllodia* flat, membranaceous, undivided, midribbed, obliquely cross-striate, internally honeycombed with rhomboidal cavities; the surface-cells minute. *Fructification* of both kinds scattered over the surface: the 1st, ovate, pedicellate *ceramidia,* containing pear-shaped spores; the 2nd, lanceolate *stichidia,* containing tripartite tetraspores.—LENORMANDIA (*Sond.*), in honour of M. René Lenormand, of Vire, Calvados, a distinguished French algologist.

Frons foliacea, prolifera. Phyllodia plana, membranacea, indivisa, costata, decussatim striata; cellulis intimis magnis lacunosis oblique ordinatis, extimis minutis inordinatis. Fruct. utriusque generis sparsus: 1, *ceramidia pedicellata, sporas pyriformes foventia;* 2, *stichidia propria, lanceolata, tetrasporas triangule divisas continentia.*

LENORMANDIA *marginata;* phyllodia thinly membranous, broadly linear-oblong, very obtuse, subemarginate, ciliate, proliferous from the margin and the surface; ceramidia and stichidia mostly marginal; nerve slender.

L. marginata; *phyllodiis tenui-membranaceis lato-lineari-oblongis obtusissimis subemarginatis ciliatis, e margine limboque proliferis; ceramidiis stichidiisque sæpissime marginalibus; nerve tenui.*

LENORMANDIA marginata, *Ner. Austr. p.* 19. *t.* 2. *Kütz. Sp. Alg. p.* 849. *Hook. Fl. Tasm. v.* 2. *p.* 295. *Harv. Alg. Exsic. Austr. n.* 129.

HAB. Abundant in the Tamar, at Georgetown, Tasmania, *R. Gunn, W. H. H., etc.*

GEOGR. DISTR. Tasmania.

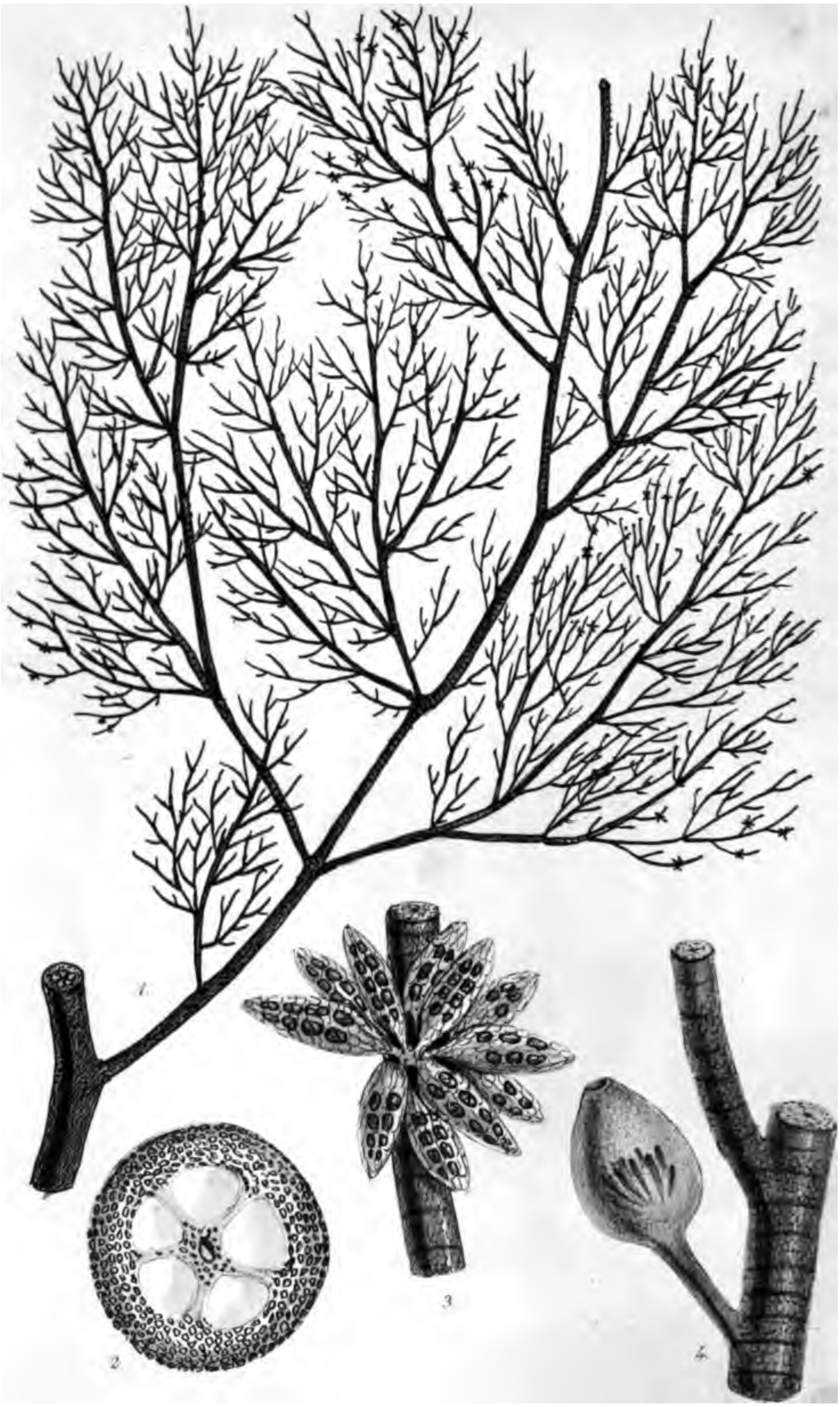
DESCR. *Frond* 6–10 inches long, and fully as much in the expansion of the proliferous branches or *phyllodia.* The *primary* phyllodia are 3–5 inches long, ½–1 inch wide, obtuse at each extremity, and of an exactly oblong figure, more or less obviously emarginate at the extremity, traversed by a very slender (sometimes obsolete) midrib, and bordered with more or less abundant ciliary processes, which are rarely absent. The *secondary* and *tertiary* phyllodia, of lesser size but similar shape, spring in the first instance from the margin of the older ones, consequently the normal condition of the frond is pinnate; but in older fronds, besides these marginal phyllodia, there are often many more, arising from the disc and spreading in all directions. Such fronds become almost globose, as if a fascicle of leaves grew in a disorderly manner from a common centre. The surface or disc of the phyllodia is commonly quite smooth and naked, marked with faint decussating lines; occasionally it bears toward the margin a few processes. Both kinds of fruit are marginal, very rarely on the disc. The *cystocarps* are ovate, shortly pedicellate, opaque, with thick walls, and contain a tuft of narrow-pyriform *spores*. The *stichidia* are linear-lanceolate, acute, densely cellular, containing *tetraspores* in a double row. The *colour* is a pale blood-red, becoming darker or even brown in the herbarium. The *substance* is firmly membranous, rather rigid when fresh, shrinking in drying; and the frond very imperfectly adheres to paper.

I am induced to figure this plant, because the figure given in 'Nereis Australis,' though faithful in its details, is incorrectly coloured, and does not represent the cystocarpic fruit (*ceramidia*), which were unknown to me when it was prepared. The marginal cilia are much more abundant in fronds that produce *stichidia*, as in the figure above referred to, than in those that bear *ceramidia*, one of which is here represented. Both are very liable to be disfigured by parasitic growths, especially by *Melobesiæ* and *Lepraliæ*, and sometimes the whole membrane is so completely incrusted, that it requires a sharp eye to recognize the species through the scurf.

Though abundant on the north coast of Tasmania, this very distinct plant has not yet been detected on the opposite shores of Bass's Straits. By collectors in Tasmania it is called "*the Cactus*," from a fancied resemblance in shape between its phyllodia and the joints of an *Opuntia*.

Fig. 1. LENORMANDIA MARGINATA,—*the natural size*. 2. Fragment of a leaf, with marginal *ceramidia*. 3. Section of a *ceramidium*. 4. *Spores*, from the same. 5. Fragment, with marginal *stichidia*. 6. A *stichidium*. 7. A *tetraspore*:—*all magnified*.

Plate CCXXXVI



Vincent Brooks Imp.

PLATE CCXXXVI.

RYTIPHLŒA ELATA, *Harv.*

GEN. CHAR. *Frond* compressed or terete, dendroid, pinnate, transversely striate, corticated; the *axis* articulated, composed of a circle of large oblong cells surrounding a central cell; the periphery of several rows of small, angular, (mostly) coloured cells. *Fructification:* 1, ovate *ceramidia,* containing a tuft of pear-shaped spores; 2, *stichidia* containing tripartite *tetraspores.*—RYTIPHLŒA (*Ag.*), from *ρυτις, a wrinkle,* and *φλοιος, bark;* because the surface is transversely furrowed or striate.

Frons compressa v. teres, dendroidea, pinnatim composita, transversim ruguloso-striata, areolata, axi articulato ex cellulis oblongis magnis pluribus cellulam centralem cingentibus conflato percursa; strato peripherico cellulis pluriseriatis angulatis corticata. Fruct.: 1, *ceramidia;* 2, *stichidia propria sæpius simplicia, tetrasporas biseriatas includentia.*

RYTIPHLŒA *elata;* tree-like (1–2 feet high); stem terete, very thick (2–3 lines in diameter), opaque, branched; branches decompound, much branched, di-trichotomous or irregularly divided, the smaller branches and ramuli spreading, transversely striate; striæ very close; axils wide; ceramidia ovate, on long pedicels; stichidia tufted, on the sides of the ramuli; primary siphons 5–6, large; cortical stratum thick, of minute cellules.

R. elata; *dendroidea (*1–2*-pedalis); caule tereti crassissimo (*2–3 *lineas diametro) opaco ramoso; ramis decomposito-ramosissimis di-trichotomis v. vage divisis, minoribus ramulisque patentibus transversim striatis; striis approximatis; axillis latissimis; ceramidiis ovatis longiuscule pedicellatis; stichidiis ad latera ramulorum fasciculatis; siphonibus primariis* 5–6 *magnis; strato corticali crasso, cellulis minutis multiseriatis constituto.*

RYTIPHLŒA elata, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 538. *Harv. Alg. Austr. Exsic. n.* 135.

RHODOMELA elata, *Sond. in Linn. v.* 25. *p.* 699.

HAB. Cast ashore at Lefèbre Peninsula, *Dr. F. Mueller!* Port Philip Heads, *Dr. Mueller and W. H. H.* Fremantle, *W. H. H. and G. Clifton.*

GEOGR. DISTR. Western and southern coasts of Australia.

DESCR. *Root* a large bulbous disc or tuber. *Frond* 1–2 feet or more in height, the stem and larger branches 3–2 lines in diameter, the secondary branches 1–½ line, excessively branched and bushy or dendroid. *Stem* simple or forked or irregularly divided; its divisions supporting decompound di-trichotomous or alternately divided *heads* of branches. Lateral branches 6–8 inches long, sometimes laxly, sometimes very densely ramuliferous; the ramuli either scattered or fasciculate, filiform, attenuated at base, tapering and acute, spreading or divaricate. All parts of the frond are opaque, coated with a thick layer of minute cellules; but, under a pocket-lens, the lesser branches and ramuli are very obviously striate transversely. *Ceramidia* ovate, solitary, scattered, on longish pedicels, rarely subsessile, opaque and thick-walled. *Stichidia* shortly lanceolate or spindle-shaped, in dense tufts on the sides of the ramuli and lesser branches, containing a double row of tetraspores. *Colour* a very dark brownish-purple, becoming black in drying. *Substance* tough and rigid. Under strong pressure the young frond will adhere to paper; the older does not adhere.

A very large, tough, and coarse-growing species, a native probably of deep water, from which branches are more frequently cast up than perfect fronds. I have seen several branches which must have been torn from fronds that were at least two feet high, and perhaps of greater height; a very large size for one of the filiform *Rhodomelaceæ.*

This Alga was originally described by Sonder as a species of *Rhodomela;* but it cannot naturally be separated generically from *Rytiphlœa tinctoria,* of which it has the structure, though differing abundantly in specific character. Notwithstanding the thickness of the cortical layer, the "*transverse striæ,*" characteristic of a *Rytiphlœa,* are plainly marked on all the younger portions at least. The distinction, however, between the filiform species of *Rytiphlœa* and *Rhodomela* is not very well marked, and depends more on the comparative size of the axile tubes and comparative thinness or translucency of the cortical layer than on any *definable* structural difference.

Fig. 1. RYTIPHLŒA ELATA, branch of a large frond,—*the natural size.* 2. Section of a branch. 3. Tuft of *stichidia.* 4. A *ceramidium:—all magnified.*

Plate CCLXII

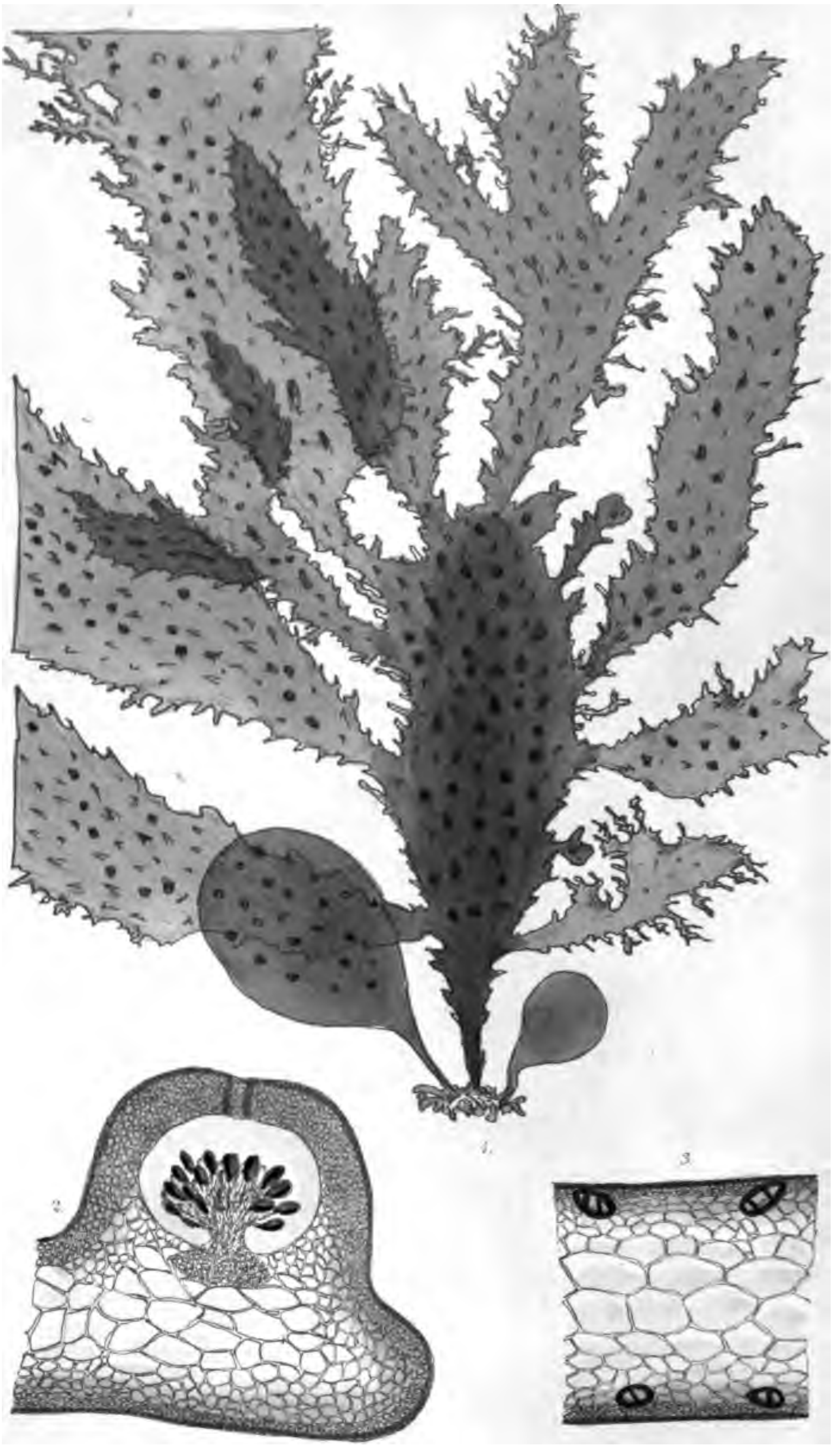


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PLATE CCXXXVII.

CALLIBLEPHARIS CONSPERSA, *Harv.*

GEN. CHAR. *Frond* flat, cartilagineo-membranaceous, dichotomo-pinnate and fimbriate, formed of two strata of cells; the *medullary* stratum of roundish-angular, large cells, in several rows; the *cortical* of minute coloured cellules. *Fructification:* 1, sessile conceptacles, containing, within a thick pericarp, on a basal placenta, a tuft of moniliform spore-threads; 2, zonate *tetraspores,* dispersed among the cortical cellules.—CALLIBLEPHARIS (*Kütz*), from καλος, *beautiful,* and βλεφαρις, literally *the eyelashes* (*cilia*), here meaning fringe-like marginal processes.

Frons plana, cartilagineo-membranacea, dichotomo-pinnata et margine ciliato-fimbriata, ex stratis duobus composita; strato medullari cellulis rotundato-angulatis magnis pluriseriatis, corticali cellulis minutis coloratis formato. Fruct.:* 1, *cystocarpia sessilia, intra pericarpium crassum ad placentam basalem fasciculum filorum sporiferorum moniliformium foventia;* 2, *tetraspora sparsæ, zonatim divisæ, in strato corticali nidulantibus.

CALLIBLEPHARIS *conspersa;* frond stipitate, cartilagineous, simple or sparingly dichotomous, pinnated from the margin; pinnæ variously cleft and fimbriate, sometimes multifid, aculeate-dentate or ciliate at the margin; disc sprinkled with spinous points or lobules; coccidia scattered over the surface of the frond.

C. conspersa; *fronde stipitata cartilaginea simplici v. parce dichotoma a margine pinnata; pinnis varie lobatis et fimbriatis nunc multifidis margine dentato-aculeatis ciliatisve; disco aculeis v. lobulis ramosis consperso; coccidiis per totam laminam conspersis.*

CALLIBLEPHARIS conspersa, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 550. *Harv. Alg. Exsic. Austr. n.* 300.

HAB. Garden Island, West Australia, *W. H. H.* Port Fairy, Victoria, *W. H. H.*

GEOGR. DISTR. West and south coasts of Australia.

DESCR. *Root* branching. *Frond* 6–8 inches long, and as much in the expansion of the laciniæ, polymorphous: when quite young, often exactly obovate and very entire, a form sometimes assumed also by the marginal lobes of older specimens; more usually obovate-oblong or ovato-lanceolate, jagged and toothed at the margin, and at length becoming *pinnate* from the evolution of the marginal teeth into lateral lobes. These lateral lobes or pinnæ are 3–8 inches long, simple or again similarly pinnate, oblong or lanceolate, much constricted at the base, very irregular in form, with the margin toothed, or ciliate, or eroso-lacerate. The surface of the frond, when young, is quite smooth and naked; when mature, mostly sprinkled with minute tooth-like processes, which sometimes change into small proliferous leaflets, and sometimes into branching ramenta. The cystocarps (*coccidia*) are very convex, with a depressed orifice, and are scattered over the disc of the whole frond. *Tetraspores* are, in like manner, scattered over the whole surface of plants that bear them. *Colour* a full, dark, blood-red, becoming darker and brownish in drying. *Substance* cartilagineo-membranous, thick and tough. In drying the frond adheres, but not strongly, to paper.

* * *

This is very similar in size, colour, ramification, and general aspect to *Call. ciliata* of the northern hemisphere, but is at once distinguishable from that species by the position of the *cystocarps*, which in *C. ciliata* are invariably borne on the marginal cilia, while in *C. conspersa* they are dispersed over the whole surface. Both species are remarkably variable in form, especially in the comparative breadth and division of the segments. So far as we know, our present plant, when young, is pretty regularly obovate, often with a perfectly entire smooth edge. A little older, it becomes erose or denticulate; then the indentations are prolonged into marginal processes, and finally into leafy lobes. During this evolution the obovate form is generally lost, changing into oblong and then to lanceolate; and the margin in the oldest fronds is very unequal and fimbriate.

Fig. 1. CALLIBLEPHARIS CONSPERSA, young and old plants,—*the natural size.* 2. Section through the frond, and a *coccidium.* 3. Section of frond, showing *tetraspores* among the surface cellules:—*magnified.*

Plate [illegible]

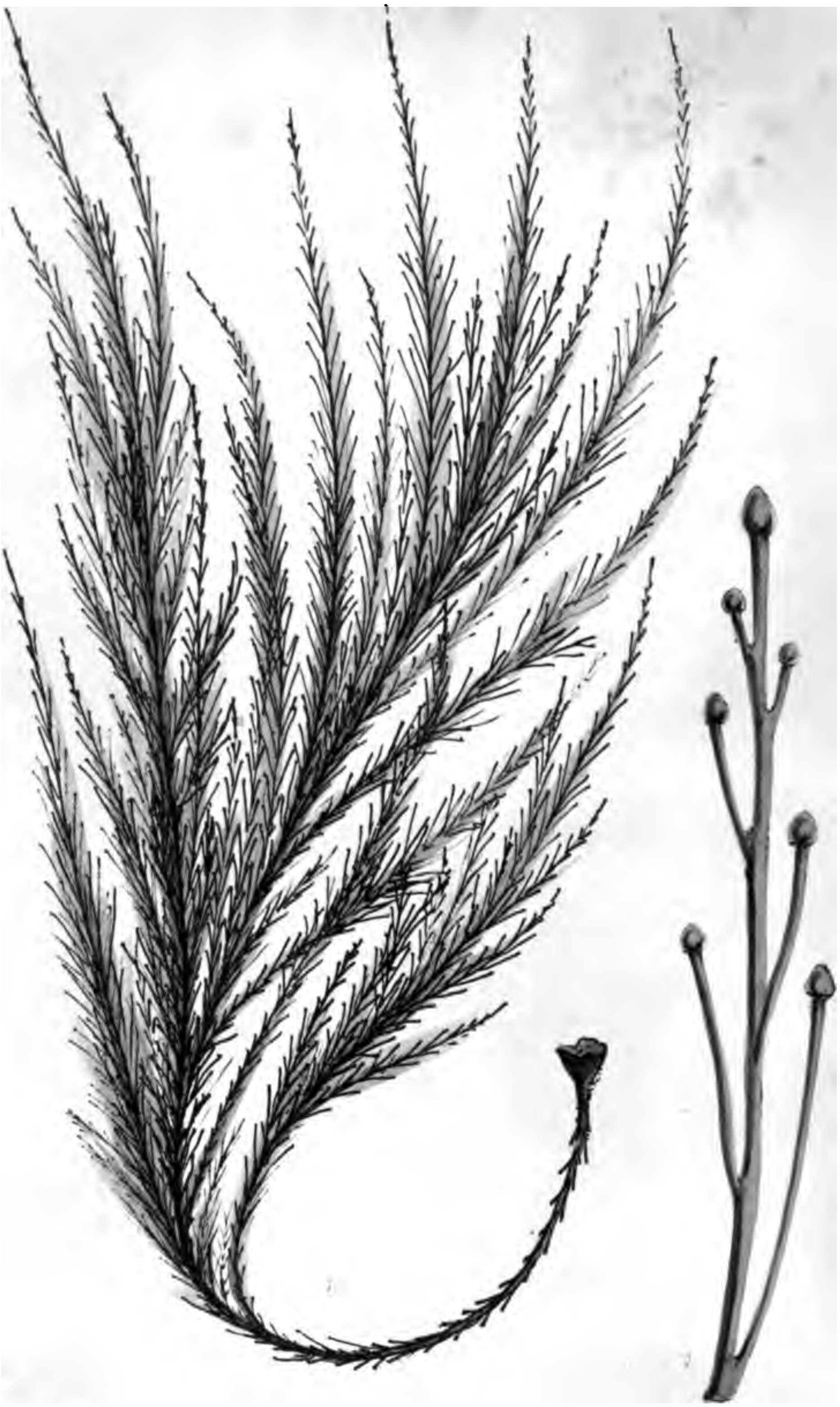


PLATE CCXXXVIII.

CARPOMITRA INERMIS, *Kütz.*

GEN. CHAR. *Frond* linear, filiform, compressed or flat and midribbed, irregularly branched. *Fructification:* mitriform receptacles terminating the branches, composed of horizontal branching filaments whorled round a vertical axis, and producing elliptic-oblong spores.—CARPOMITRA (*Kütz.*), from καρπος, *fruit,* and *μιτρα, a cap* or *mitre.*

Frons linearis, filiformis, compressa v. plana, costata, vage ramosa. Fruct.: 1, *receptacula apice ramorum mitræformia, sporis paranematibusque undique vestita. Sporæ oblongæ.*

CARPOMITRA *inermis;* frond caulescent, alternately branched; branches long, virgate, filiform, densely ramulous; ramuli setaceous, long or short, erecto-patent; receptacles ovoid, ending the uppermost ramuli.

C. inermis; *fronde caulescente alterna ramosa; ramis elongatis virgatis filiformibus dense ramulosis; ramulis setaceis longis v. abbreviatis erecto-patentibus; receptaculis ovoideis ramulos coronantibus.*

CARPOMITRA inermis, *Kütz. Sp. Alg. p.* 570. *J. Ag. Sp. Alg. v.* 1. *p.* 178. *Fl. Tasm. v.* 2. *p.* 289. *Harv. Alg. Exsic. Austr. n.* 55.

CARPOMITRA caudata. *J. Ag. l. c. p.* 178.

SPOROCHNUS inermis, *Ag. Sp. Alg. p.* 155. *Syst. p.* 260.

FUCUS inermis, *Turn. Hist. t.* 186.

FUCUS caudatus, *Labill. Nov. Holl. t.* 259. *f.* 1.

HAB. Port Fairy and Port Phillip. In the Tamar, Tasmania.

GEOGR. DISTR. South coasts of New Holland. Tasmania.

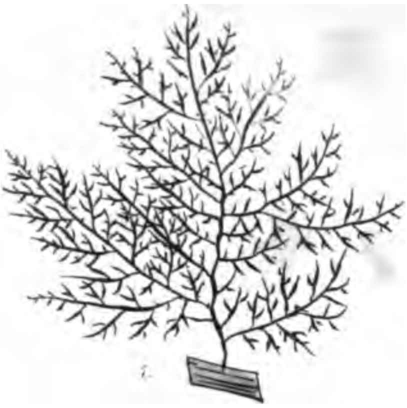
DESCR. *Root* tuberous, densely clothed with reddish-brown woolly fibres. *Frond* 1–2 feet high, dendroid or bushy. *Stems* one or several, densely clothed near the base with brownish woolly filaments, and rough or spiny with the remains of broken branches, undivided, closely set with alternate branches in the upper half. *Branches* 6–12 inches long or more, virgate, once or twice compound, the primary and secondary divisions more or less copiously furnished with erecto-patent ramuli. *Ramuli* bristle-like, long or short, few or copious, straight, subacute. *Fructification* not perfectly known; several of my specimens produce ovoid or conical, swollen, gland-like bodies (*receptacles ?*) at the ends of the upper ramuli, but in none of them have I succeeded in finding spores. The *substance* is very rigid, quite wiry when dried. The *colour* is a clear brownish-olive, becoming very dark or blackish in the herbarium.

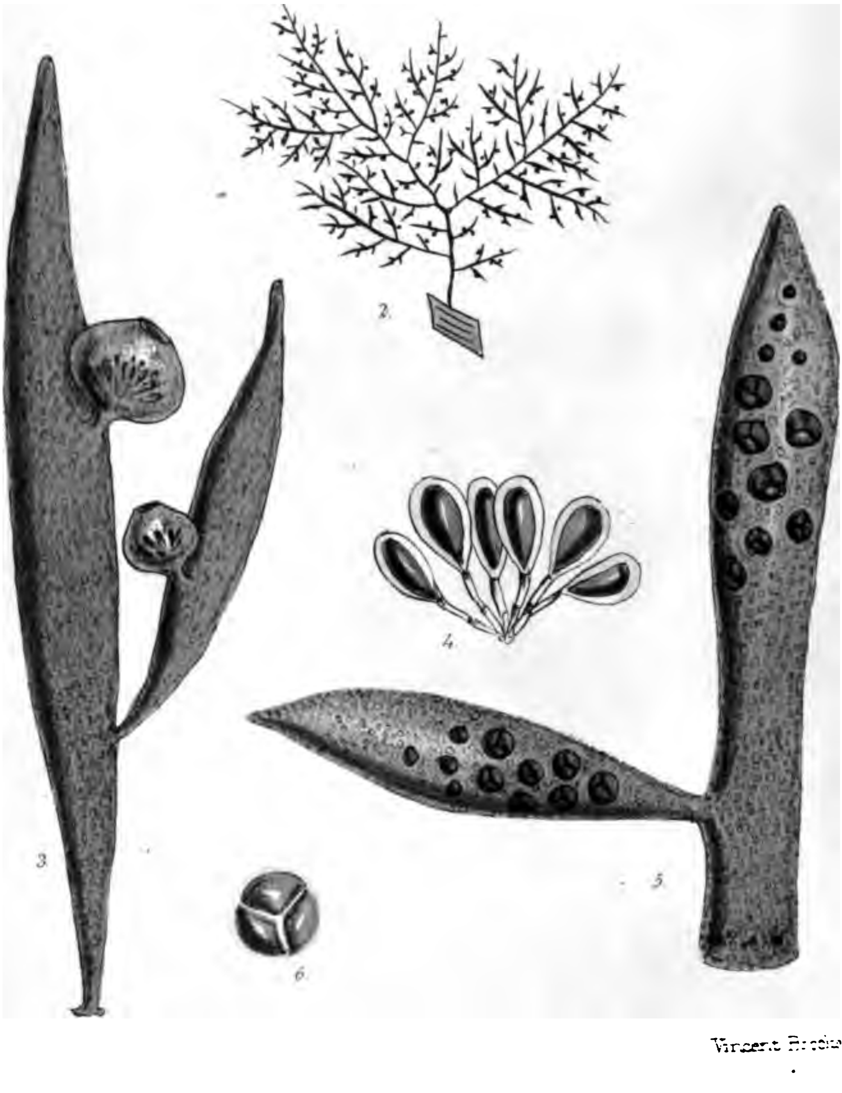
A coarse-growing and very rigid plant, with a habit not unlike some of the larger specimens of *Sporochnus scoparia*. Different specimens vary considerably in appearance, owing to the greater copiousness of the branches and ramuli in some, and their different proportionate length. Younger specimens are frequently clothed down to the very base of the stem. These variations have given rise to the supposed existence of two species, *C. inermis* and *C. caudata*, which however cannot be separated by any tangible characters.

I regret that I have been unable, on any of my numerous specimens, to detect *spores* or *paranemata* in the mitræform terminal tubercles, which externally resemble receptacles, and which, according to Turner, are the fruit. Either they are receptacles in a very imperfectly organized condition, or merely glandular tips. Future observations must be waited for, to settle this question.

Fig. 1. CARPOMITRA INERMIS,—*the natural size.* 2. Ramuli, with unripe or imperfect receptacles,—*slightly magnified.*

Plate CCXXVI.





Vincent Brooks Imp.

PLATE CCXXXIX.

CHONDRIA LANCEOLATA, *Harv.*

GEN. CHAR. *Frond* filiform, cartilagineous, dendroid, opaque, coated with small, polygonal, irregularly placed cells. *Axis* articulated, polysiphonous. *Ramuli* clavæform, much constricted at their insertion. *Fructification:* 1, ovate *ceramidia;* 2, tripartite *tetraspores,* formed irregularly, in the clavate ramuli.—CHONDRIA (*Ag.*), *χονδρος, cartilage.*

Frons filiformis, cartilaginea, dendroidea, opaca, cellulis irregularibus polygonis corticata. Axis articulatus, polysiphonus. Ramuli clavati, basi constricti. Fruct.: 1, ceramidia ovata; 2, tetrasporæ triangule divisæ, in ramulis immersæ, sparsæ v. irregulariter aggregatæ.

CHONDRIA *lanceolata;* frond of small size (1–2 inches high), compressed, cartilagineous, alternately branched, nearly distichous; branches and ramuli alternate, tapering to the base and apex, acute; ceramidia ovate, pedicellate; tetraspores clustered under the tips of the ramuli.

Ch. lanceolata; *fronde pusilla* (1-2 *unciali*) *compressa cartilaginea alterne ramosa subdisticha; ramis ramulisque alternis basi et apice attenuatis acutis; ceramidiis ovatis pedicellatis; tetrasporis sub apicibus ramulorum congestis.*

CHONDRIA lanceolata, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 539. *Harv. Alg. Exsic. Austr. n.* 156.

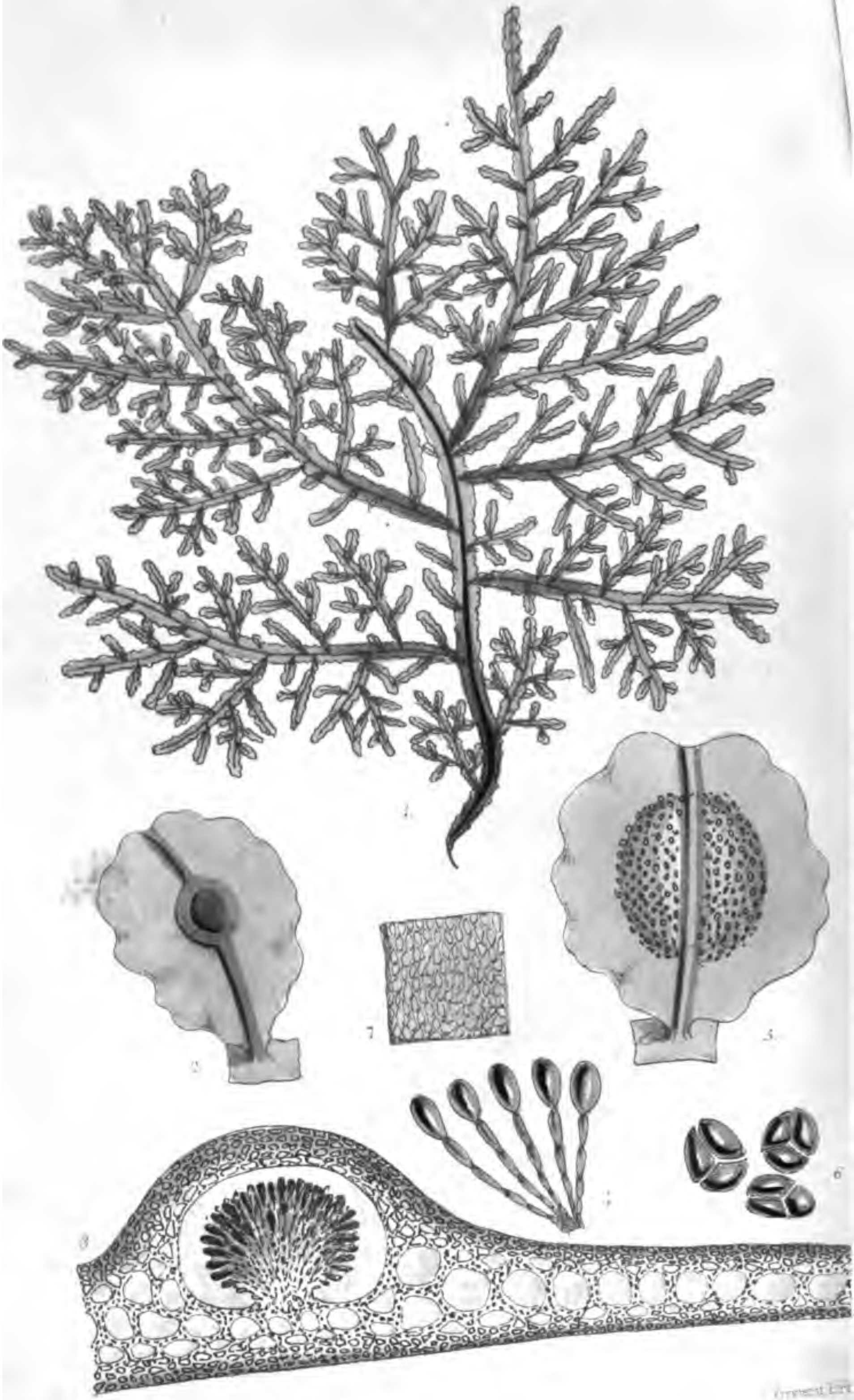
HAB. On leaves of *Zostera marina,* at Rottnest Island, *W. H. H.*

GEOGR. DISTR. Western Australia.

DESCR. *Root* a small disc. *Frond* one to two inches high, and as much in the expansion of the branches, strongly compressed, nearly distichous, decompoundly branched. Main *stem* flexuous; *branches* alternate, spreading, once twice or thrice subdivided, tapering to the base and apex; *ramuli* few, scattered or alternate, lanceolate, acute or acuminate, much contracted at their insertion. *Ceramidia* broadly ovate, wide-mouthed, pedicellate, mostly on the ramuli. *Tetraspores* collected in sori, under the tips of the ramuli. The specimens that produce tetraspores are more luxuriant and decompound than those that bear ceramidia. The *colour* is a dark brown-red, becoming browner in the herbarium. The *substance* is soft, but not gelatinous, and tolerably firm, not soon decomposing in fresh water; and in drying the frond adheres closely to paper.

This is a small species of the sub-section, typified by *Ch. tenuissima,* in which the ramuli are more or less acute or acuminate. It is perhaps most nearly allied to *Ch. fusifolia*, or to the North American *Ch. atro-purpurea*, but from both it differs in the strongly compressed or sometimes flattened frond, the small size, and comparative slenderness. As yet it has only been found on *Zostera* leaves, at the Island of Rottnest, where it is not very uncommon.

Fig. 1. CHONDRIA LANCEOLATA; a *tetraspore*-bearing specimen. 2. A *cystocarp*-bearing specimen:—both *the natural size*. 3. Ramuli, bearing *cystocarps*. 4. A cluster of *spores*, from the same. 5. Ramuli, bearing *tetraspores*. 6. A *tetraspore*:—*variously magnified*.



Vincent Br

PLATE CCXL.

CHAUVINIA IMBRICATA, *Harv.*

GEN. CHAR. *Frond* leaf-like, cartilagineo-coriaceous, symmetrical, simple or proliferous, midribbed, composed of two strata of cells; the *medullary* stratum of oblong, polygonal, larger cells; the *cortical* of minute, irregularly placed cellules. *Fructification* of both kinds borne on proper fruit-leaflets: 1, hemispherical, sessile conceptacles (*coccidia*), containing a tuft of moniliform sporethreads on a basal placenta; 2, tripartite *tetraspores,* in definite *sori* or spots.—CHAUVINIA (*Harv.*), in honour of M. Chauvin, a distinguished French botanist.

Frons foliacea, cartilagineo-coriacea, symmetrica, simplex v. e costa prolifera, costata, stratis duobus composita; strato medullari ex cellulis majusculis oblongis polyhedris, corticali cellulis minimis coloratis pluriseriatis conflato. Fructus utriusque generis in sporophyllis propriis evolutus; 1, *coccidia sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

CHAUVINIA *imbricata;* frond narrow-linear, obtuse, very entire, wavy or curled, proliferous, becoming excessively compound by leaflets springing from the midribs of older leaves.

C. imbricata; *fronde anguste-lineari obtusa integerrima undata v. crispata prolifera, demum foliolis a costa prorumpentibus decomposite-ramosissima.*

DELESSERIA imbricata, *Aresch. in Act. Reg. Soc. Sc. Ups. Ser.* 3. *v.* 1. *p.* 346.

DELESSERIA neglecta, *Sond.*

DELESSERIA rigida, *Harv. in Alg. Exsic. Austr. n.* 276.

HAB. South Australia, *Dr. Curdie, Dr. Mueller.* Port Philip Heads, abundantly, *W. H. H., etc.*

GEOGR. DISTR. South coasts of Australia.

DESCR. *Root* discoid. *Primary frond* 4–5 inches long, 2–3 lines wide, minutely stipitate and acute at base, exactly linear, obtuse at the apex, very entire, more or less curled or wavy, traversed by a more or less strongly marked immersed midrib, destitute of lateral veins. This primary frond emits from its midrib, at short intervals throughout its whole length, and without order, numerous similar fronds, which emit others; and this mode of proliferous ramification is repeated several times, until there results a nearly globose, excessively compound general frond, whose leaves and leaflets are closely *imbricated* one on another. There is, however, no true branch, even in the most compound fronds. *Sporophylls* or fruit-leaves of roundish or oblong form, 1–2 lines in length and breadth, are plentifully borne by the midribs of older leaves, at length thickly covering them, and bear either *conceptacles* or *sori* of tetraspores. The *conceptacles* are always on the midrib of the sporophyll, hemispherical, thick-walled, containing a nearly globular tuft of moniliform sporethreads. The *sori* are in pairs, one at each side of the midrib of the sporophyll. The *colour*, when fresh, is a rather dull pale-red, becoming paler on exposure, and brownish in the herbarium. The *substance* is very rigid and tough, and the frond in drying does not adhere to paper.

Under *Delesseria coriifolia* (Plate CL.) I remarked that the structure of its membrane was different from that of most others of the genus *Delesseria*, except *D. Hookeri*,* and that these two species formed a natural section or group, which might be considered as a separate genus. I now find a similar structure in the frond of *D. imbricata*, Aresch.; and, taking into consideration the difference of *substance*, as well as of cellular *structure* between these three species of the Southern Ocean and all other *Delesseriæ*, I think they constitute a well-marked and natural generic group, which I propose to call CHAUVINIA, in memory of a distinguished French botanist who made the Algæ his special and most beloved study. The genus *Chauvinia*, Bory, founded on a part of the older genus *Caulerpa*, has not been generally adopted by botanists. The group to which I now give M. Chauvin's honoured name is, I trust, established on characters universally recognized by systematic botanists as sufficient in defining genera among Algæ. The structure must be regarded as a step in advance over that of *Delesseria*. It is very like that of *Stenogramme* or of *Rhodymenia*.

CHAUVINIA *Hookeri* (Del. Hookeri, *Fl. Nov. Zeal. t.* cxiv., cxv.) is one of the very noblest of southern Rhodosperms, its brilliant fronds being sometimes nearly two feet long and several inches wide. *C. imbricata*, here figured, is both of common occurrence and small size, but when well coloured and free from parasites, is a very pretty little plant. *C. coriifolia*, which is intermediate in size, is perhaps the rarest of the three.

Fig. 1. CHAUVINIA IMBRICATA,—*the natural size*. 2. A *sporophyll* or fruit-leaf, bearing a conceptacle. 3. Section of a conceptacle and part of the sporophyll, showing the cellular structure of the membrane. 4. Sporethreads from the conceptacle. 5. A sporophyll, with a *sorus* of tetraspores. 6. Tetraspores, from the same:—*more or less highly magnified.*

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* *D. Middendorfii* was also doubtfully alluded to, but a microscopic examination of its frond shows it to be a true *Delesseria*.